2024-2025

BKCS TOC Book

BKCS Impact Factor: Beyond 3 & Toward 5

Prof. Wonwoo Nam
Editor-in-Chief, BKCS

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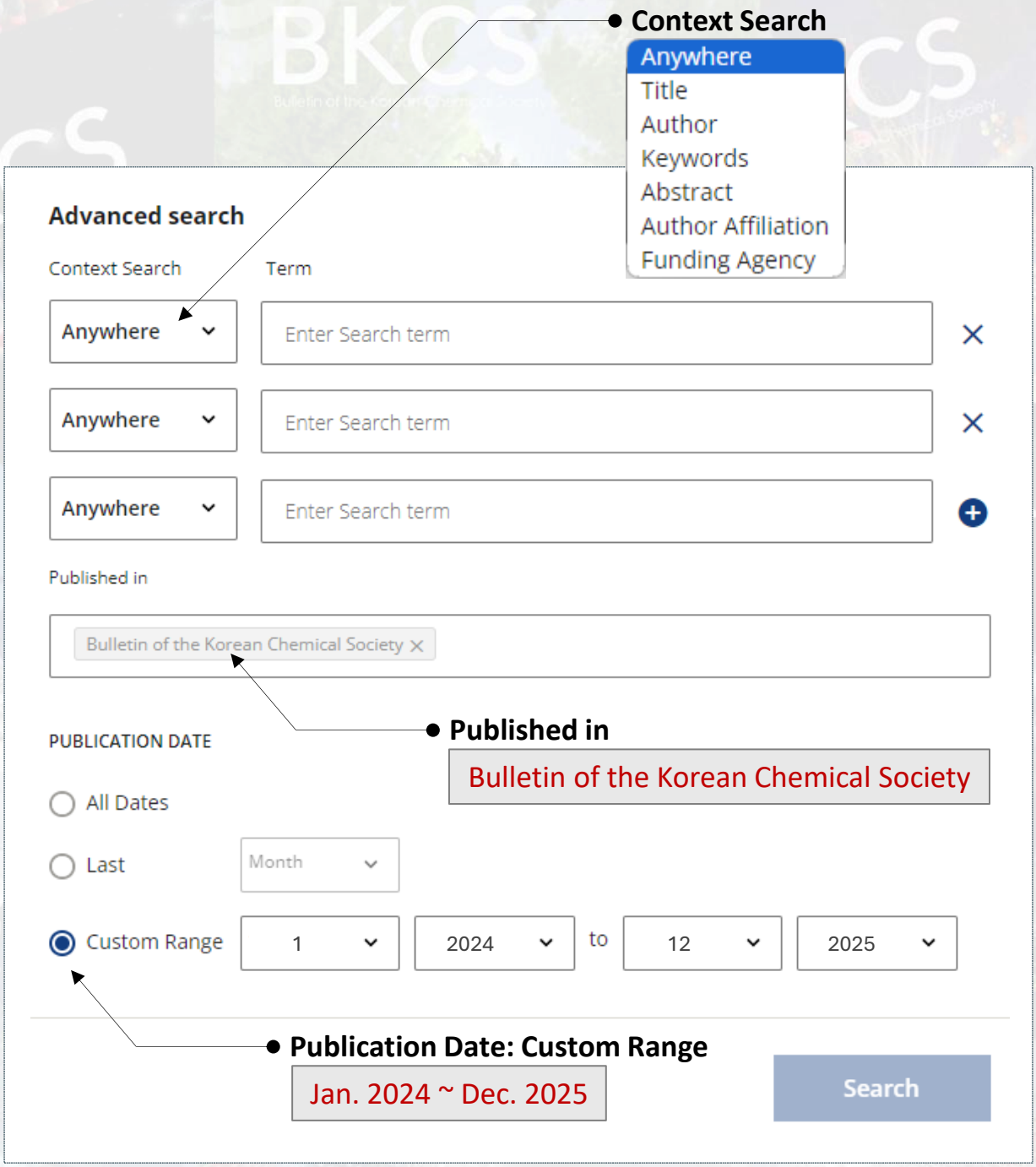

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Article A

2024-2025 BKCS TOC Book

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BKCS Impact Factor:
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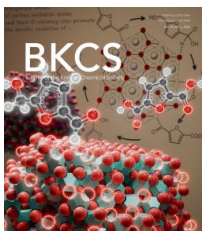
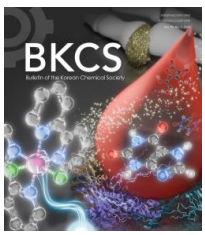

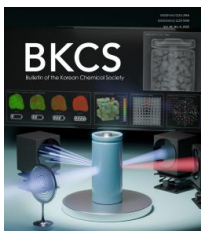

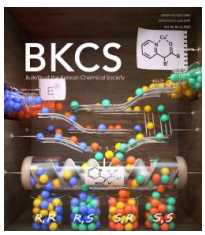
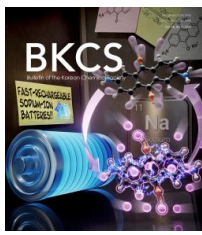
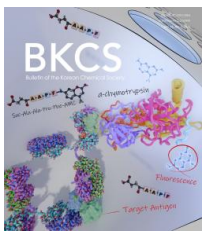
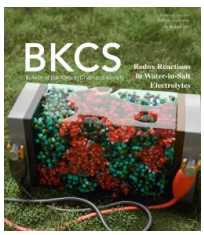

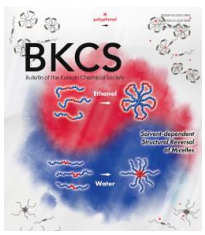


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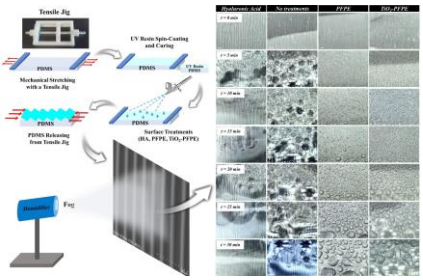
C

Fog collection using hydrophobic and hydrophilic treatments on wrinkle-based multilayered surfaces

Yongseong Kim, Huihwa Kim, Hyun-ju Choi



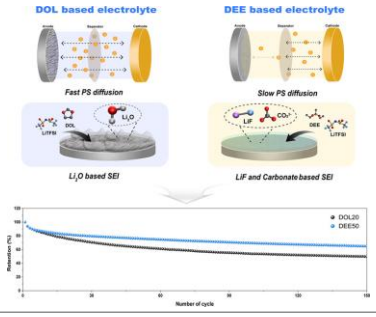
This study demonstrates that regions facing severe water shortages due to climate change can significantly benefit from fog collection as a crucial water resource. Wrinkle-based hydrophilic–hydrophobic surface structures show considerable potential for improving fog-collection efficiency.

Bull. Korean Chem. Soc. **2024**, *45*, 987-992. https://doi.org/10.1002/bkcs.12916

A

1,1-Diethoxyethane as an interfacial-stabilizing solvent for lithium–sulfur batteries

Juhwi Park, Tae-Hyun Kim, Taeeun Yim



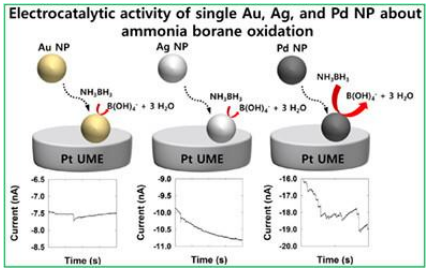
The DEE is proposed as a surface-stabilizing cosolvent for lithium–sulfur batteries (LSBs). The electrochemical reduction of DEE affords organic/inorganic-based solid-electrolyte interphases at the Li anode by participating in the electrochemical reactions. The DEE protects the Li anode and inhibits the dissolution of polysulfide, leading to improved cycling retention of LSBs.

Bull. Korean Chem. Soc. **2024**, *45*, 74-80. https://doi.org/10.1002/bkcs.12796

A

Investigation of electrocatalytic activity of palladium nanoparticle for ammonia borane oxidation via single-entity electrochemistry

Seungyoung Park, Ki Jun Kim, Seong Jung Kwon



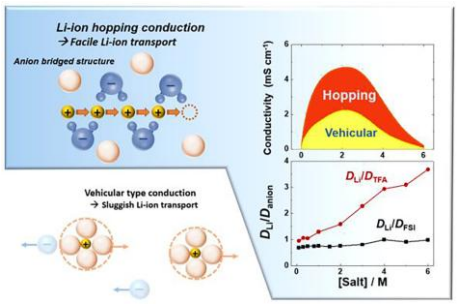
The electrocatalytic behavior of Au, Ag, and Pd nanoparticles (NPs) about ammonia borane (AB) oxidation was investigated at a single level. By analyzing with transient current signal of each NPs based on single-entity electrochemistry measurements, the Pd NP was appropriate for applying an electrocatalyst for AB oxidation when the Pt electrode was used as a support electrode in alkaline conditions.

Bull. Korean Chem. Soc. **2024**, *45*, 81-88. https://doi.org/10.1002/bkcs.12797

A

Li-ion hopping conduction enabled by associative Li-salt in acetonitrile solutions

Bonhyeop Koo, Hyejin Lee, Kisung Park, Sunwook Hwang, Hochun Lee

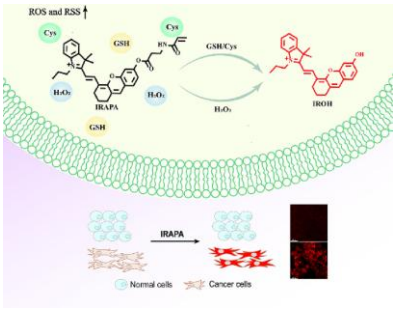


This study demonstrates Li-ion hopping conduction in monodentate acetonitrile (AN) electrolytes via anion-bridged structures with highly associative Li-salt (LiTFA). PFG-NMR confirms Li-ion hopping by illustrating the rapid mobility of Li-ions in comparison to the anion within LiTFA-AN. Raman and DRS analysis reveals that Li-ion hopping occurs due to the predominance of associated ion species in LiTFA-AN.

Bull. Korean Chem. Soc. **2024**, *45*, 92-100. https://doi.org/10.1002/bkcs.12802

A A biothiols and H_2O_2 responsive fluorescence probe for selective cancer imaging

Nan Yin, Guixin Qin, Yuting Wang, Jiali Tang, Xin Yao, Qingling Xu

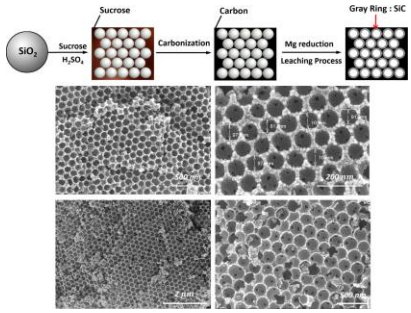


A novel NIR fluorescent probe IRAPA response toward H_2O_2, glutathione and cysteine has been developed and applied for distinguishing cancer from normal cells/tissues.

Bull. Korean Chem. Soc. **2024**, *45*, 252-258. https://doi.org/10.1002/bkcs.12811

C Facile synthesis process for preparing silicon carbide with unique honeycomb structure

Quynh Thi Nguyen, Quy Son Luu, Jiwon Kim, Uyen Thi Do, Yeeun Park, Jihyun Kim, Youngbok Lee



Bull. Korean Chem. Soc. **2024**, *45*, 238-242. https://doi.org/10.1002/bkcs.12817

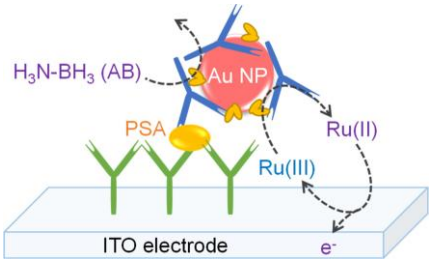
A Method development for gas chromatography-tandem mass spectrometry analysis of trace level polycyclicaromatic hydrocarbons, alkyl polycyclicaromatic hydrocarbons, polychlorinated biphenyls, and organochlorinepesticides in pine needle specimen

David Chung, Tae Kyung Kim, Ki Wan Park, Seo Yeong Choi, Yun-Suk Oh, Ho-Sang Shin

Bull. Korean Chem. Soc. **2024**, *45*, 259-272. https://doi.org/10.1002/bkcs.12812

A Au nanoparticle-catalyzed electron transfer from ammonia-borane to $Ru(NH_3)_6^{3+}$ for sensitive biosensing

Seonhwa Park, Aman Bhatia, Ponnusamy Nandhakumar, Jihyeon Kim, Haesik Yang



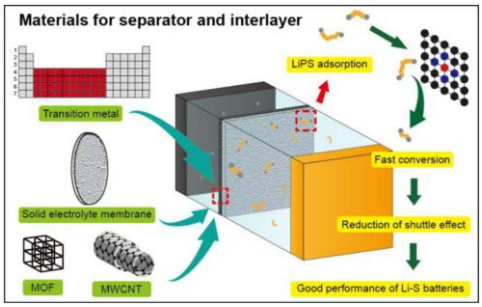
Au nanoparticle (NP)-catalyzed electron transfer (ET) from ammonia-borane to $Ru(NH_3)_6^{3+}$ is efficient for high signal amplification. The small, highly charged $Ru(NH_3)_6^{3+}$ undergoes rapid ET, has high water solubility, and effectively penetrates bio/organic layers on Au NPs. Applying Au NP-catalyzed ET to prostate-specific antigen detection achieved a low detection limit of 10 pg/mL.

Bull. Korean Chem. Soc. **2024**, *45*, 366-372. https://doi.org/10.1002/bkcs.12831

R

Recent interlayer and separator design approaches for high-performance Li–S batteries

Hyo-Yeol Choi, Si-Hwan Lee, Hyuk-Joon Yu, Seung-Ho Yu



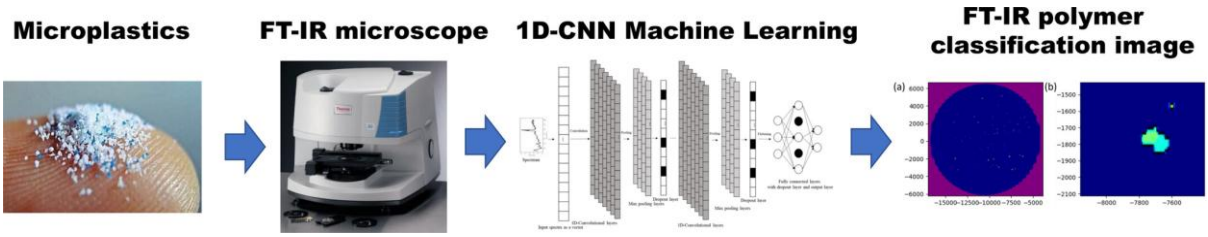
In Li–S batteries, interlayers and separators inevitably encounter lithium polysulfides (LiPS). Moreover, the shuttle effect of LiPS is very lethal in Li–S batteries. This review focuses on recent interlayer and separator design approaches to high-performance Li–S batteries by mitigating the problems in Li–S batteries.

Bull. Korean Chem. Soc. **2024**, *45*, 382-397. https://doi.org/10.1002/bkcs.12833

A

Development of a machine-learning model for microplastic analysis in an FT-IR microscopy image

Eunwoo Choi, Yejin Choi, Hyoyoung Lee, Jae-Woo Kim, Han Bin Oh

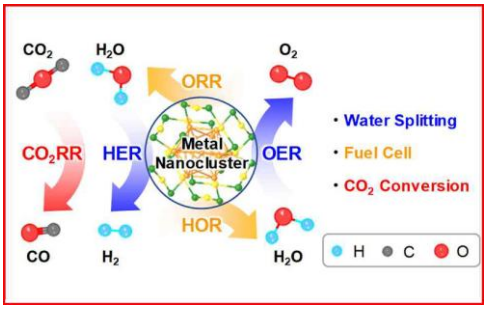


Bull. Korean Chem. Soc. **2024**, *45*, 472-481. https://doi.org/10.1002/bkcs.12835

R

Atomically precise metal nanoclusters for energy conversion

Hoeun Seong, Dongil Lee



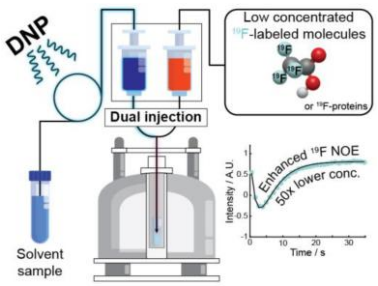
This review examines the performances of atomically precise metal nanoclusters as the electrocatalysts of energy conversion reactions, namely water splitting, fuel cell, and CO_2 conversion reactions, focusing on the strategies used to promote catalytic activity and discussing the future perspectives and resolution of the remaining challenges.

Bull. Korean Chem. Soc. **2024**, *45*, 435-450. https://doi.org/10.1002/bkcs.12842

A

NOE analysis using dual injection DNP-NMR for studies of solvent–solute interactions at low concentrations

Jihyun Kim



Bull. Korean Chem. Soc. **2024**, *45*, 560-566. https://doi.org/10.1002/bkcs.12852

R

Droplet microfluidics for single-molecule and single-cell analysis in research, diagnosis, and therapy

Joel Sanchez Barea, Dong-Ku Kang

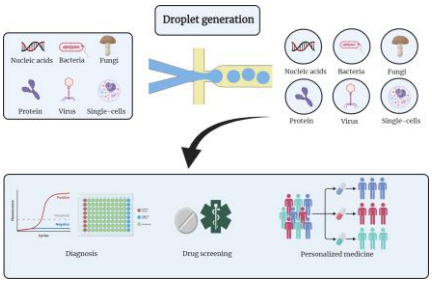


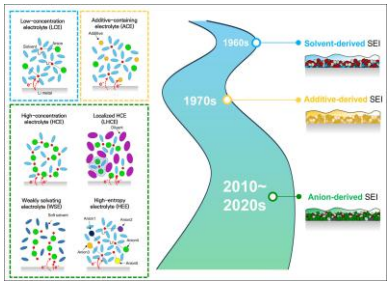
Table of contents droplet microfluidics for molecular and single-cell analysis. Droplet microfluidics can be applied to the analysis of numerous types of samples and lead to more accurate diagnoses and therapies.

Bull. Korean Chem. Soc. **2024**, *45*, 495-502. https://doi.org/10.1002/bkcs.12848

R

Modulation of Li^+ microenvironment in liquid electrolyte for interface design of Li-metal anodes

Minhong Lim, Jiwon Lee, Soyeon Lee, Seungsoo Park, Hongkyung Lee



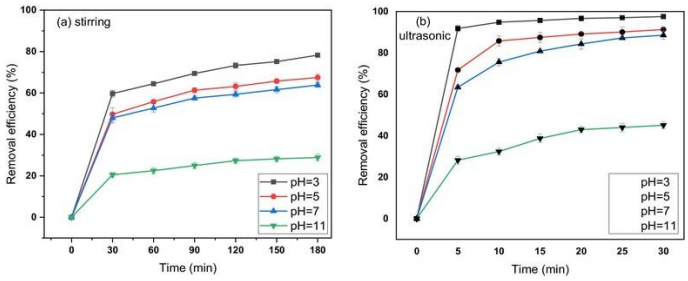
Li metal batteries suffer from the issue of dendrite formation, closely associated with electrolytes, which form the solid-electrolyte interphase (SEI). This review explored historical advancements in electrolytes, ranging from low-concentration to high-concentration and high-entropy formulations, aimed at reinforcing the SEI with anion-derived components to suppress the Li dendrite.

Bull. Korean Chem. Soc. **2024**, *45*, 648-663. https://doi.org/10.1002/bkcs.12884

A

Removal of Acid Orange 7 dye using Makgeolli lees with ultrasonic assistance

Nguyen Van Kien, Sunghwan Kim, Jae Jeong Ryoo



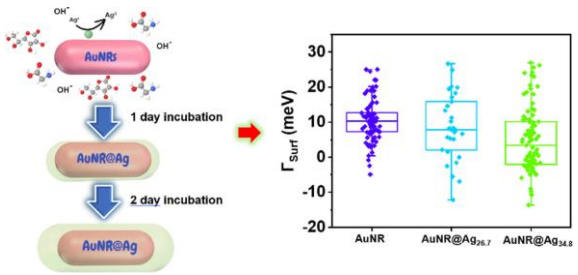
Effect of initial pH on the adsorption of AO7 on Makgeolli lees.

Bull. Korean Chem. Soc. **2024**, *45*, 770-777. https://doi.org/10.1002/bkcs.12892

C

Elucidating plasmon damping in silver-coated gold nanorods: Single particle analysis and damping adjustment

Rafifah Hana Raihana Syam, Ji Won Ha



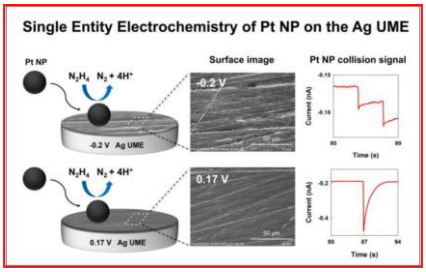
We examined the structural heterogeneity of the Ag shell and the effect of Ag content on the LSPR properties of single AuNRs@Ag. Moreover, this study enhances the understanding of plasmon damping resulting from the interaction at the Ag and Au interface.

Bull. Korean Chem. Soc. **2024**, *45*, 764-769. https://doi.org/10.1002/bkcs.12894

A

Enhanced signal to noise ratio of single entity electrochemistry signal of platinum nanoparticles using passive silver ultramicroelectrode

Seongkyeong Yoon, Jaedo Na, Sun Gyu Moon, Heewon Kim, Ki Jun Kim, Seong Jung Kwon



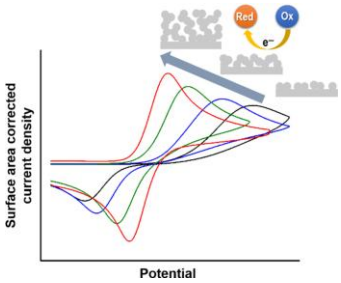
For the first time, single-entity electrochemistry of Pt NPs was observed using an Ag UME. Two characteristic current responses, staircases and blips, were seen during NP collisions, depending on the applied potential. At 0.13 and 0.17 V, Ag UME forms a delicate oxide layer, stabilizing background current. This improves the S/N ratio, offering an advantage over other UMEs like Au, C, Ni, and Hg.

Bull. Korean Chem. Soc. **2024**, *45*, 911-919. https://doi.org/10.1002/bkcs.12905

A

Enhanced electrocatalytic activity by nanoconfinement effects at nanoporous indium tin oxide electrodes

Minjee Seo, Je Hyun Bae



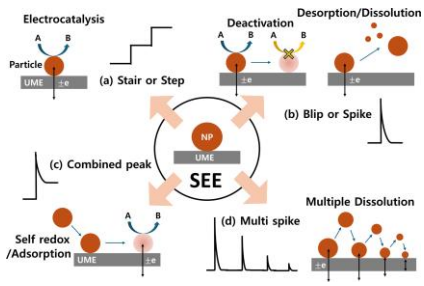
Nanostructured indium tin oxide electrodes with differing nanoporous layer thickness were fabricated to observe the electrokinetics of ferric/ferrous redox reaction and oxygen reduction reaction. This way, we analyzed the contribution of nanoconfinement effects toward the enhanced electrocatalysis in nanoporous structures.

Bull. Korean Chem. Soc. **2024**, *45*, 993-999. https://doi.org/10.1002/bkcs.12912

R

Signal shape analysis in single-entity electrochemistry: Understanding electrochemical reaction dynamics

Huichang Park, Jaedo Na, Yujin Han, Dain Heo, Seongkyeong Yoon, Sunwoo Geum, Seong Jung Kwon



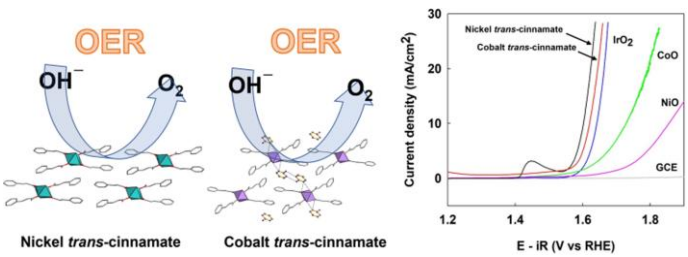
This review categorizes the signal shapes observed in single-entity electrochemistry (SEE). Signals such as staircase, spike, and combined peak responses provide insights into processes such as electrocatalysis, deactivation, and adsorption. This analysis helps to interpret electrochemical reaction dynamics at the single-entity level.

Bull. Korean Chem. Soc. **2024**, *45*, 949-965. https://doi.org/10.1002/bkcs.12911

A

Comparison of oxygen evolution reaction performance for Ni and Co using isostructural trans-cinnamate complexes

Hyewon Shin, Sunwoo Geum, Jimin Lee, Minkyun Shin, Kang Min Ok, Seong Jung Kwon, Junghwan Do



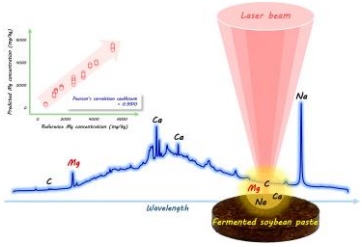
Isostructural nickel and cobalt trans-cinnamate complexes were synthesized via a hydrothermal method. Both complexes demonstrated superior OER catalytic performance compared to IrO_2, with the Ni complex showing particularly strong activity. These excellent characteristics were attributed to the electron delocalization of the metal centers via interactions with π–π delocalized organic ligands.

Bull. Korean Chem. Soc. **2024**, *45*, 920-928. https://doi.org/10.1002/bkcs.12910

A

Feasibility of low-power low-resolution laser-induced breakdown spectroscopy for quantification of Mg in fermented soybean pastes

Hyemin Jung, Yujin Oh, Minji Kwon, Hanbeom Choi, Hyang Kim, Sandeep Kumar, Song-Hee Han, Hojin Kim, Haejin Kim, Sang-Ho Nam, Yonghoon Lee



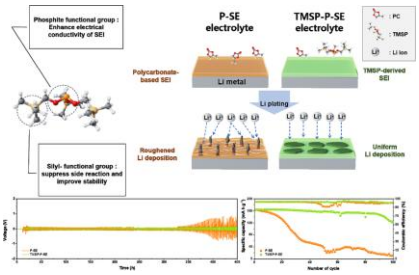
This study utilizes a cost-effective laser-induced breakdown spectroscopy (LIBS) instrument to analyze magnesium (Mg) in fermented soybean pastes, showing the feasibility of using real products as calibration standards supported by other methods. The compact, low-cost LIBS instrument offers an alternative for quantitative mineral analysis and raw material identification, correlating Mg concentrations with the types of salts used.

Bull. Korean Chem. Soc. **2024**, *45*, 1021-1030. https://doi.org/10.1002/bkcs.12917

A

Interfacial stabilization of lithium metal anodes in propylene carbonate electrolytes with tris(trimethylsilyl) phosphite

Dagyo Kim, Ji Seong Heo, Youngkwon Kim, Taeeun Yim



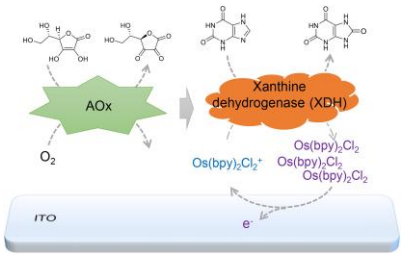
This study explores the effect of TMSP additive in PC-based electrolytes for the stabilizing Li anodes. The TMSP additive provides the formation of stable $LiSiO_x$ and $Li_xPO_yF_z$-based solid electrolyte interfaces (SEI) at the Li anode, leading to inhibiting the uneven dendritic Li growth at the anode interface, which results in improved cycling retention of Li/NCM622 cells based on the effective preventing decomposition of the electrolytes at Li anodes.

Bull. Korean Chem. Soc. **2025**, *46*, 145-151. https://doi.org/10.1002/bkcs.12935

A

Enhancing electrochemical xanthine detection: A two-step incubation strategy to minimize interference from ascorbic acid

Taeyeon Yoo, Seonhwa Park, Hyoeun Lee, Subin Park, Youngsuk Kim, Haesik Yang



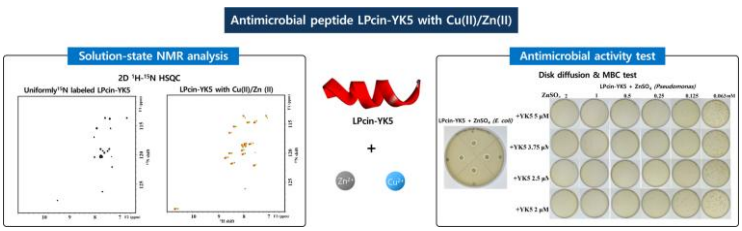
To minimize interference from ascorbic acid and ascorbate oxidase in electrochemical enzyme-based xanthine detection, a two-step incubation process has been employed. Xanthine dehydrogenase in combination with $Os(bpy)_2Cl_2^+$ has been selected to obtain high signal-to-background ratios and achieves a detection limit of ~500 nM in artificial serum.

Bull. Korean Chem. Soc. **2025**, *46*, 156-163. https://doi.org/10.1002/bkcs.12936

A

NMR structural studies of antimicrobial peptide, LPcin-YK5, with divalent metal ion and its antimicrobial activity

Minseon Kim, Jujin Park, Yongae Kim



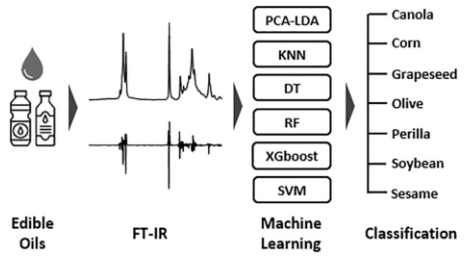
We conducted solution-state NMR and antimicrobial activity tests to determine the interaction and antimicrobial effect of LPcin-YK5, an antimicrobial peptide candidate, with divalent ions. The synergistic effect between YK5 and divalent ions suggests that it can be developed as an effective antimicrobial that inhibits the growth of gram-positive/-negative bacteria.

Bull. Korean Chem. Soc. **2025**, *46*, 122-130. https://doi.org/10.1002/bkcs.12929

A

Comparison of machine learning models for classifying edible oils using Fourier-transform infrared spectroscopy

Hyeona Lim, Seon Yeong Lee, Jin Young Kim, Yeon Ju Shin, Yerin Jang, Hyeonjin Kim, Byung Hee Kim, Sangdoo Ahn



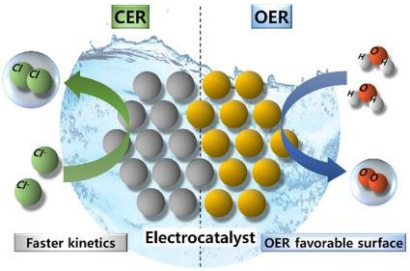
This study examines the classification of edible oils using fourier-transform infrared (FT-IR) spectroscopy combined with machine learning techniques. Second derivative preprocessing improved classification accuracy across six models, identifying principal component analysis followed by linear discriminant analysis (PCA-LDA) and support vector machines (SVM) as the most effective methods.

Bull. Korean Chem. Soc. **2025**, *46*, 131-137. https://doi.org/10.1002/bkcs.12932

R

Addressing selectivity challenges in seawater splitting: Catalyst design for oxygen and chlorine evolution reactions

Gisang Park, Minjeong Kim, Joon Yong Park, Ki Min Nam



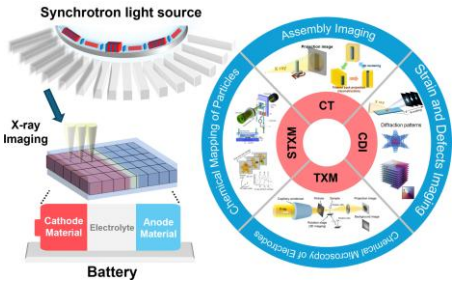
This review presents recent advancements in electrocatalysts for seawater splitting, focusing on the mechanisms of anode reactions and strategies to control reaction selectivity through catalyst design. Additionally, it highlights key opportunities and challenges for improving efficiency and scalability in seawater electrolysis technology.

Bull. Korean Chem. Soc. **2025**, *46*, 253-264. https://doi.org/10.1002/bkcs.70003

R

X-ray imaging methods for multiscale characterization of batteries

Sebastian Kunze, Chihyun Nam, Hwiho Kim, Jinkyu Chung, Eunki Hong, Jaejung Song, Hanbi Choi, Jongwoo Lim



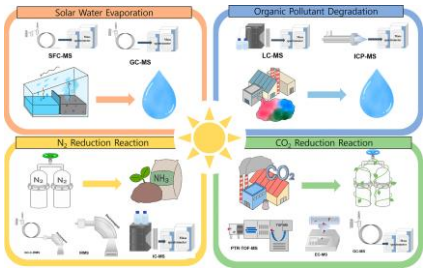
X-ray imaging is revolutionizing battery research by offering multiscale insights into structure, composition, and chemistry, from micrometers to nanometers. Operando imaging captures real-time changes during cycling, revealing dynamic processes and localized effects inaccessible through traditional methods. Advances in resolution and data analysis make these techniques vital for understanding and improving batteries.

Bull. Korean Chem. Soc. **2025**, *46*, 360-380. https://doi.org/10.1002/bkcs.70009

R

The pivotal role of mass spectrometry in transition metal-based photocatalyst research for solar-driven energy conversion and water purification advancements

Haheun Yoo, Hyojin Hwang, Hyojin Kang, Jeongkwon Kim, Jaebeom Lee



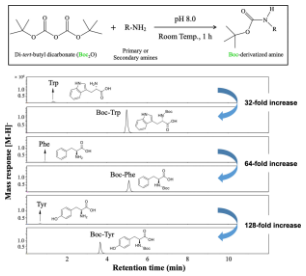
This review explores recent advancements in the integration of solar energy conversion and water remediation with mass spectrometry as an analytical technique. We examine Ti-based photocatalysts for their roles in energy conversion and water purification, utilizing mass spectrometric analysis to evaluate the efficiency of these mechanisms.

Bull. Korean Chem. Soc. **2025**, *46*, 381-412. https://doi.org/10.1002/bkcs.70015

A

Method development of amine-containing metabolite analysis using di-*tert*-butyl dicarbonate derivatization coupled with liquid chromatography-mass spectrometry

Lei Peng, Jeong Joo Pyo, Soo Hyun Park, Yongsoo Choi



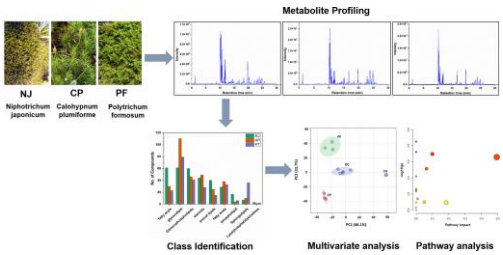
To utilize reversed-phase liquid chromatography-mass spectrometry in amine metabolites analysis, we report an amine derivatization method based on the N-*tert*-butyloxycarbonylation reaction, referred to as the N-t-Boc reaction. The Boc reaction is simple, fast, cheap, and environmentally friendly. The reaction process is catalyst-free and takes place in water at room temperature. Boc derivatization allows significant enhancement of column retention and signal detection of amine metabolites with considerable stability. This method could be a valuable tool in the field of metabolomics, particularly for the screening of amine metabolites.

Bull. Korean Chem. Soc. **2025**, *46*, 562-569. https://doi.org/10.1002/bkcs.70027

A

Non-targeted metabolite profiling reveals biochemical diversity of three East Asian mosses

Fatima Tuz Zahra, Kyungwon Min, Jungeun Lee, Maeng-Joon Jung, Hyoungseok Lee, Sunghwan Kim



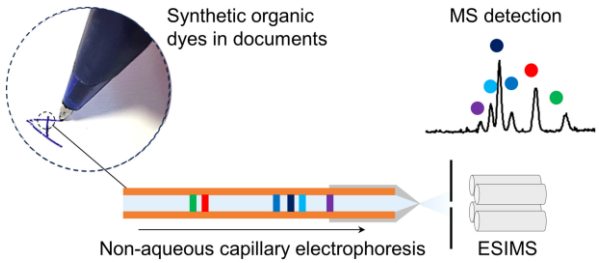
Mosses are known for their bioactive composition and adaptation to environmental stresses. This study explores the metabolic diversity of three East Asian moss species, *Niphotrichum japonicum*, *Calohypnum plumiforme*, and *Polytrichum formosum*, using high-resolution mass spectrometry. Lipids, particularly unsaturated fatty acids linked to cold adaptation, were most prevalent. Multivariate and pathway analysis revealed species-specific traits and survival strategies, providing insights into their ecological functions, biochemical diversity, and environmental resilience mechanisms.

Bull. Korean Chem. Soc. **2025**, *46*, 641-653. https://doi.org/10.1002/bkcs.70032

C

Online nonaqueous capillary electrophoresis–mass spectrometry method for the simultaneous screening of synthetic organic dyes

Joon Yub Kwon, Yun-Cheol Na, Seong Ho Kang



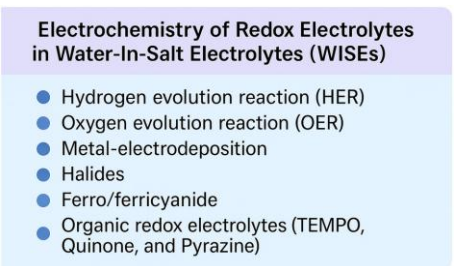
Synthetic organic dyes in documents were screened using online nonaqueous capillary electrophoresis–mass spectrometry.

Bull. Korean Chem. Soc. **2025**, *46*, 882-886. https://doi.org/10.1002/bkcs.70059

R

Redox electrolyte reactions under water-in-salt conditions: A mini review

Jaeyoung Lee, Jinho Chang

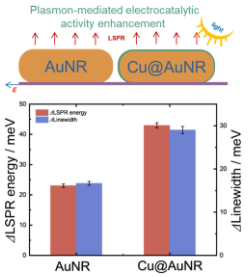


This mini review highlights how highly concentrated salt aqueous electrolytes (WISEs) influence the electrochemical behavior, stability, and solvation structures of diverse redox-active species, including HER, OER, electrodeposition of metals, halides, ferri/ferrocyanide, and organic redox electrolytes (TEMPO, quinone, pyrazine).

Bull. Korean Chem. Soc. **2025**, *46*, 867-881. https://doi.org/10.1002/bkcs.70057

A Single-particle spectroelectrochemistry: Electrochemically engineered Cu adlayers boost plasmon-driven electrocatalysis in gold nanorods

Mukunthan Ramasamy, Ji Won Ha

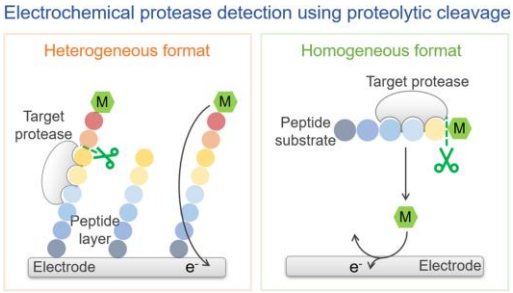


We present the formation of Cu layers on individual AuNRs immobilized on an ITO substrate as a function of potential and their effect on the localized surface plasmon resonance (LSPR) property of individual AuNRs by in situ monitoring of LSPR spectral changes in AuNRs.

Bull. Korean Chem. Soc. **2025**, *46*, 1018-1024. https://doi.org/10.1002/bkcs.70065

R Electrochemical protease detection strategies based on proteolytic cleavage

Seonhwa Park, Haesik Yang



Electrochemical protease detection strategies based on proteolytic cleavage are classified into heterogeneous and homogeneous formats, enabling sensitive, rapid, and point-of-care diagnostics. This review outlines substrate design, signal-transduction modes, and future directions to improve detection of low-abundance proteases with high specificity.

Bull. Korean Chem. Soc. **2025**, *46*, 994-1008. https://doi.org/10.1002/bkcs.70071

BKCS Bulletin of the Korean Chemical Society

Review R

Personal Account P

Communication C

Article A

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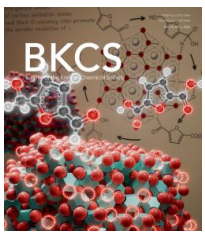

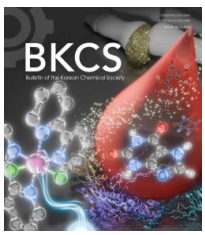

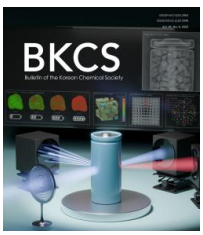

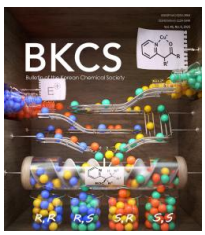

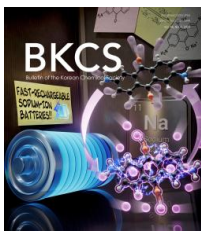

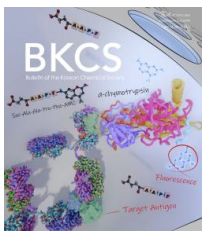

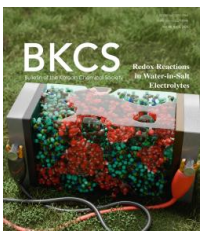

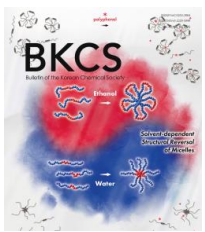

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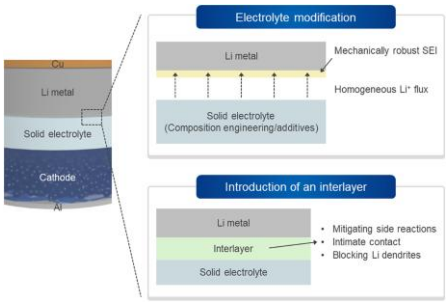
R

Interfacial challenges and recent advances of solid-state lithium metal batteries

Wooyoung Jeong, Jonghyeok Yun, Jong-Won Lee



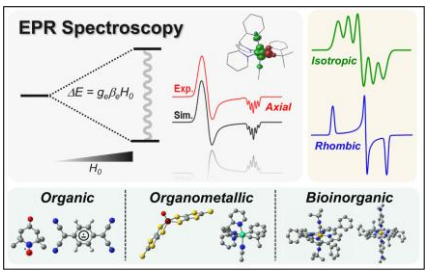
This study reviews various solid electrolytes with high Li^+ conductivity and their interfacial issues in solid-state lithium metal batteries. Furthermore, recent advances in strategies to stabilize the interface between the lithium anode and solid electrolytes are also provided, in terms of the electrolyte modification and introduction of an interlayer.

Bull. Korean Chem. Soc. **2024**, *45*, 806-820. https://doi.org/10.1002/bkcs.12900

R

EPR spectroscopy: A versatile tool for exploring transition metal complexes in organometallic and bioinorganic chemistry

Minyoung Ju, Jin Kim, Jeongcheol Shin



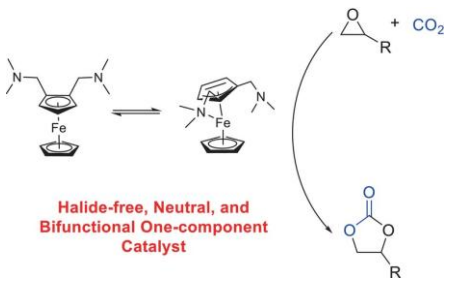
This review discusses electron paramagnetic resonance (EPR) spectroscopic methods for characterization of transition metal complexes. EPR spectroscopy provides valuable insights into the geometric, electronic, and magnetic properties of paramagnetic molecules, reinforcing the blind spot of nuclear magnetic resonance spectroscopy-based structural analysis.

Bull. Korean Chem. Soc. **2024**, *45*, 835-862. https://doi.org/10.1002/bkcs.12899

A

Synthesis and computational studies for halide-free, neutral, and bifunctional one-component ferrocene-based catalysts for the coupling of carbon dioxide and epoxides

Jieun Lee, Wooram Lee, Yoseph Kim, Mujin Choi, Seol Ryu, Joonkyung Jang, Youngjo Kim



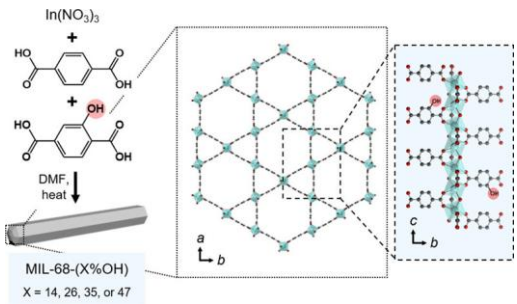
Enhanced catalytic activity for the coupling reaction of CO_2 and epoxides via introduction of two dimethylamino groups into the same cyclopentadienyl ligand.

Bull. Korean Chem. Soc. **2024**, *45*, 821-827. https://doi.org/10.1002/bkcs.12901

A

Enhanced early-stage adsorption of chemical warfare agent simulant by MIL-68-(X%OH)

Gihyun Lee, Sojin Oh, Moonhyun Oh

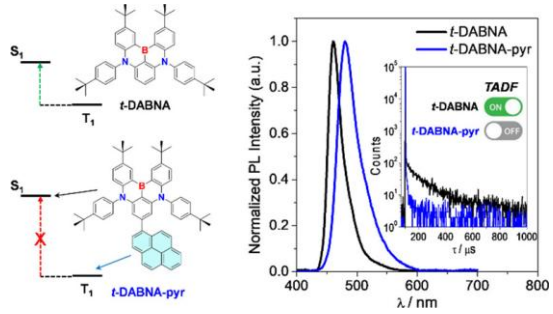


Metal–organic framework-based adsorbents are developed for the effective capture of chemical warfare agent (CWA) simulant, especially in the early stage of its exposure. The incorporation of dangling OH groups into an MIL-68 framework leads to a remarkable enhancement for CWA simulant adsorption at early-stage exposure to its vapor.

Bull. Korean Chem. Soc. **2024**, *45*, 67-73. https://doi.org/10.1002/bkcs.12794

A Boron- and nitrogen-embedded blue multi-resonance emitters with low triplet energy

Hanif Mubarok, Taehwan Lee, Jaehoon Jung, Min Hyung Lee

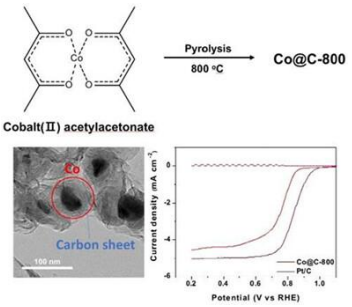


Boron- and nitrogen-embedded multi-resonance emitters, appended with a polycyclic aromatic hydrocarbon (PAH) group, have been prepared. The presence of the PAH unit enlarges the singlet-triplet gap of the emitter by reducing the energy of the triplet state localized at the PAH unit. As a result, *t*-DABNA-pyr exhibits an intense narrowband sky-blue emission that lacks thermally activated delayed fluorescence characteristics.

Bull. Korean Chem. Soc. **2024**, *45*, 16-22. https://doi.org/10.1002/bkcs.12793

A One pot production of Co core/carbon shell materials and their electrocatalytic properties

Yunseok Shin, Sungjin Park

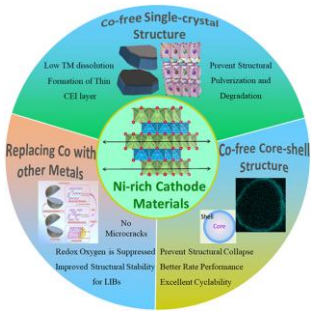


Core–shell materials containing carbon shells surrounding Co particles are prepared one-pot process and show excellent electrocatalytic oxygen reduction reaction performance and stability.

Bull. Korean Chem. Soc. **2024**, *45*, 23-31. https://doi.org/10.1002/bkcs.12798

R Recent progress in Co-free, Ni-rich cathode materials for lithium-ion batteries

Sk. Khaja Hussain, Jin Ho Bang

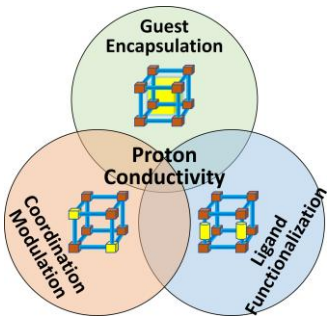


This article discusses recent advances, innovative design approaches, and prospects for the development of Co-free, Ni-rich cathode materials for Li-ion battery applications.

Bull. Korean Chem. Soc. **2024**, *45*, 4-15. https://doi.org/10.1002/bkcs.12799

R Post-synthetic modifications in metal–organic frameworks for high proton conductivity

Amitosh Sharma, Seonghwan Lee, Jaewoong Lim, Myoung Soo Lah

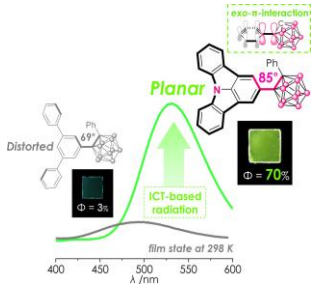


MOFs have attracted research as proton conductors for fuel cells. Our review summarizes key methods for achieving superprotonic conductivity in MOFs, categorizing them into: guest molecule encapsulation, metal-coordination site modulation, and ligand functionalization. We highlight the role of each strategy and explore future MOF developments.

Bull. Korean Chem. Soc. **2024**, *45*, 145-156. https://doi.org/10.1002/bkcs.12801

A geometric key for enhancing the radiative efficiency of *ortho*-carboranyl luminophores: Indolocarbazole- and *m*-terphenyl-*ortho*-carboranes

Mingi Kim, Kanghee Cho, Yung Ju Seo, Junhyeok Choi, Namkyun Kim, Ilsup Shin, Kang Mun Lee

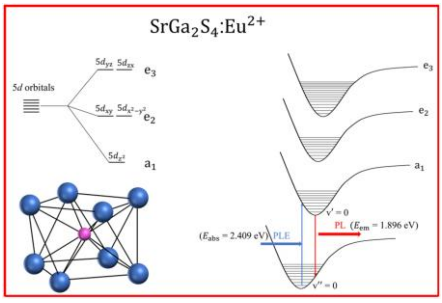


The significant difference between the solid-state intramolecular-charge-transfer-based radiative efficiencies between indolocarbazole- and *m*-terphenyl-appended *o*-carboranyl luminophores verifies that the geometric feature of π-conjugated aromatic groups significant influences radiative decay processes.

Bull. Korean Chem. Soc. **2024**, *45*, 101-109. https://doi.org/10.1002/bkcs.12804

Photoluminescence properties of Eu^{2+}-activated thiogallate phosphors

Young-Sik Cho, Moon-Su Bok, Young-Duk Huh

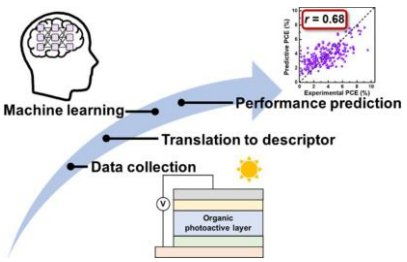


This work analyzes the crystal structural properties and photoluminescence properties of six Eu^{2+}-activated thiogallates: $CaGa_2S_4:Eu^{2+}$, $SrGa_2S_4:Eu^{2+}$, $EuGa_2S_4$, $BaGa_2S_4:Eu^{2+}$, $Sr_2Ga_2S_5:Eu^{2+}$, and $Eu_2Ga_2S_5$.

Bull. Korean Chem. Soc. **2024**, *45*, 157-164. https://doi.org/10.1002/bkcs.12805

Molecular structural descriptor-assisted machine learning for organic photovoltaics with perylenediimide acceptors

Gyu-Hee Kim, Keonho Yoon, Chihyung Lee, Minwoo Nam, Doo-Hyun Ko

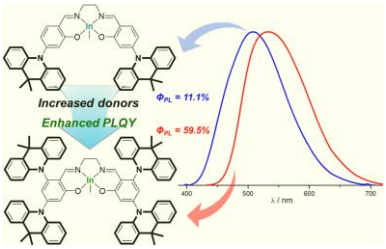


Machine learning (ML) was introduced to accelerate the discovery process of materials for high-efficiency organic photovoltaics (OPVs). Our descriptor was designed to translate the molecular structures of potential materials into a concise matrix. Our ML models, trained with a descriptor, accurately predicted the performance of OPVs using only the molecular structure information of the materials.

Bull. Korean Chem. Soc. **2024**, *45*, 125-130. https://doi.org/10.1002/bkcs.12810

Photophysical properties of 9,9-dimethyl-9,10-dihydroacridine-functionalized salen–indium complexes: Effects of structural rigidity and number of donor substituents

Yoseph Kim, Ji Hye Lee, Jaehoon Kim, Yeonsu Kim, Hyeonkwon Moon, Hyonseok Hwang, Junseong Lee, Jun Hui Park, Youngjo Kim, Myung Hwan Park



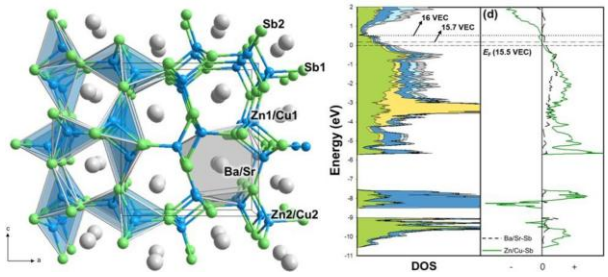
4-DMAC- and 4,6-di-DMAC-functionalized salen–indium complexes were prepared to elucidate the effect of the substituents number and structural rigidity on photophysical properties. Among them, 4,6-di-DMAC-substituted salen–In complex exhibited strong green emission with the PLQY of 59.5% in a PMMA film.

Bull. Korean Chem. Soc. **2024**, *45*, 940-948. https://doi.org/10.1002/bkcs.12918

C

Effect of co-substitution on complex thermoelectric compounds: The Zintl phase $Ba_{1-x}Sr_xZn_{2-y}Cu_ySb_2$ system

Jiwon Jeong, Daewon Shim, Myung-Ho Choi, Kang Min Ok, Tae-Soo You



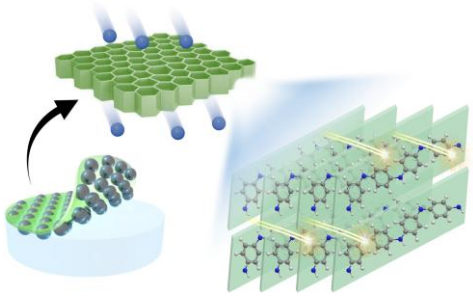
Three complex Zintl phase compounds belonging to the $Ba_{1-x}Sr_xZn_{2-y}Cu_ySb_2$ system were successfully synthesized with the co-substitution of Sr and Cu for Ba and Zn, and DFT calculations indicated that the p-type Cu substitution strengthened the structural stability and enhanced the carrier concentration.

Bull. Korean Chem. Soc. **2024**, *45*, 165-170. https://doi.org/10.1002/bkcs.12806

R

Porous pathways: Exploring the future of conducting polymers

Hyeonseong Ham, Geunhong Sim, Woongsik Choi, Moon Jeong Park



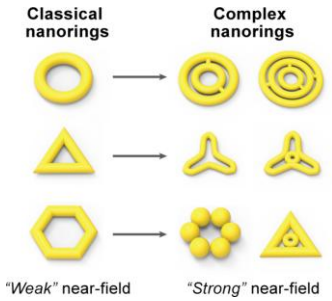
Extensive research has focused on nanostructured conducting polymers (CPs), employing diverse synthetic methods. Introducing porous morphologies in two-dimensional CPs enhances their functionality, facilitating efficient mass/charge transport. The development of self-supporting, two-dimensional porous CPs holds promise for next-gen energy storage and flexible electronics, pushing the boundaries of materials science.

Bull. Korean Chem. Soc. **2024**, *45*, 200-213. https://doi.org/10.1002/bkcs.12814

P

Wet-chemical synthesis of two-dimensional complex nanorings for near-field focusing

Insub Jung, Sungwoo Lee, Soohyun Lee, Sungho Park



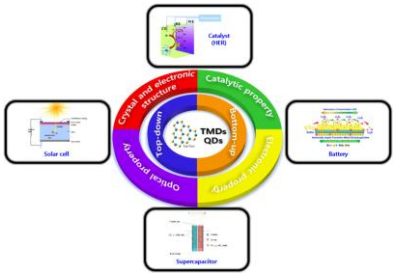
Plasmonic nanorings have gained significant interest because of their unique shape-related optical properties. However, a classical simple ring architecture has shown limitations on low electromagnetic field enhancement. Utilizing rationally designed synthesis methods, a diverse set of complex-shape plasmonic nanorings can be realized, along with strong improvement in near-field focusing.

Bull. Korean Chem. Soc. **2024**, *45*, 228-237. https://doi.org/10.1002/bkcs.12815

R

Transition metal dichalcogenide quantum dots: Synthesis, properties, and applications for electrochemistry, energy storage, and solar cells

Hoon Ju Lee, Weiguang Yang, Hyeon Suk Shin



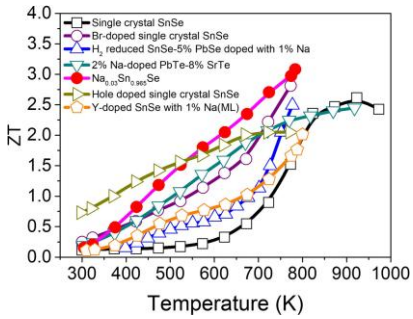
In this article, we briefly review the various popular synthesis methods of transition metal dichalcogenides (TMDs) quantum dots (QDs). We summarize the optical, electronic, and catalytic properties of TMD QDs. Furthermore, recent progress on electrochemistry, energy storage, and solar cell applications of TMD QDs is summarized in detail. Finally, we summarize current research bottlenecks of TMD QDs and discuss potential avenues for future research.

Bull. Korean Chem. Soc. **2024**, *45*, 214-227. https://doi.org/10.1002/bkcs.12816

R

SnSe: The rise of the ultrahigh thermoelectric performance material

Taeshik Kim, Hyungseok Lee, In Chung



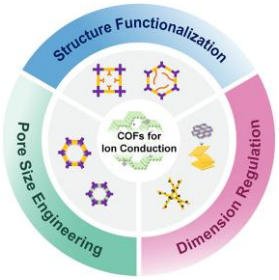
This short review introduces the emergence of a new class of high-performance thermoelectric material SnSe. This simple binary compound exhibits unprecedented thermoelectric properties mainly attributed to its unique crystal structure. The resulting electronic and phonon structures are highly favorable for thermoelectric materials. The new synthesis method finally revealed its intrinsic physical properties for the first time. The resultantly obtained, record-high thermoelectric figure of merit 3.1 has not been achieved so far from any bulk material systems, showing the paradigm change in thermoelectric technology. This achievement also highlights the importance of high-level inorganic synthesis and discovery of new materials.

Bull. Korean Chem. Soc. **2024**, *45*, 186-199. https://doi.org/10.1002/bkcs.12821

R

From structure to function: Harnessing the ionic conductivity of covalent organic frameworks

Cong-Xue Liu, Soomin Hwang, Hyerin Woo, Eunsung Lee, Sarah S. Park



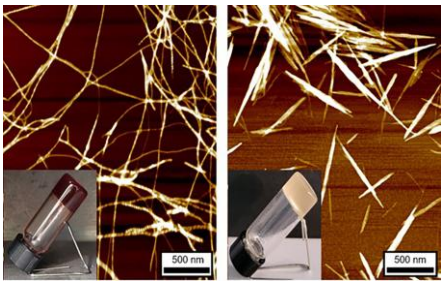
COFs have drawn considerable research attention as ion conductors in energy storage applications. Our review outlines various approaches to achieve improved ionic conductivity in COFs, classified them into three categories: structural functionalization, pore size engineering, and dimensional regulation. We emphasize the significance of each strategy and its contribution to enhancing the ionic conductivity of COFs.

Bull. Korean Chem. Soc. **2024**, *45*, 296-307. https://doi.org/10.1002/bkcs.12823

C

Metal-triggered supramolecular hydrogels based on bipyridine ligand possessing hydrazine moieties with metal ions

Kayeong Go, Sehee Kim, MinHye Kim, Heekyoung Choi, Sung Ho Jung, Jong Hwa Jung



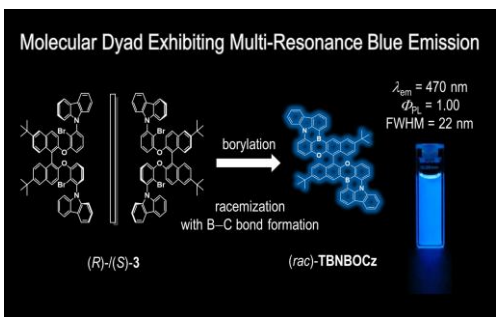
Bipyridine-based gelator 1 having two D-alanine units was prepared, and the metallosupramolecular hydrogel was formed in the presence of $Co(NO_3)_2$ and $AgNO_3$. The atomic force microscopy (AFM) image of 1 with $Co(NO_3)_2$ revealed well-defined helical fibers. In contrast, the AFM image of 1 with $AgNO_3$ showed shorter linear fiber structures.

Bull. Korean Chem. Soc. **2024**, *45*, 243-246. https://doi.org/10.1002/bkcs.12818

A

Molecular dyad exhibiting strong multi-resonance blue fluorescence

Byung Hak Jhun, Youngmin You



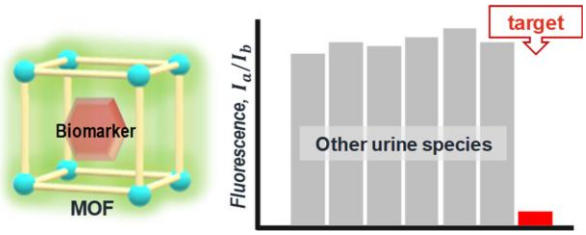
Axially chiral molecular dyads of multi-resonance-fluorescent azaoxaborin exhibit strong blue fluorescence, but the dyads are chiroptically inactive due to racemization in the borylation step.

Bull. Korean Chem. Soc. **2024**, *45*, 322-330. https://doi.org/10.1002/bkcs.12824

R

Metal–organic frameworks as a fluorescent probe for detection of pathogenic biomarkers in human urine

Seyeon Jeong, Hoi Ri Moon



This review introduces the recent progress in various applications of metal–organic frameworks (MOFs) as fluorescence probes for detecting diseases in human urinary samples. The host-guest interactions between MOFs and analytes change the emission properties of MOFs, showcasing the identification of specific biomarkers. Highly tunable and controllable MOFs can be the ideal platform for designing luminescent probes for diagnostic markers in human urine with high selectivity and low detection limits.

Bull. Korean Chem. Soc. **2024**, *45*, 308-316. https://doi.org/10.1002/bkcs.12827

A

Photocatalytic degradation of 4-nitrophenol by using multicomponent Cu_2O-Cu@TiO_2 nanoparticle aggregates

Jianwei Jiang, Seokyeong Moon, Sungho Yoon, Longhai Piao

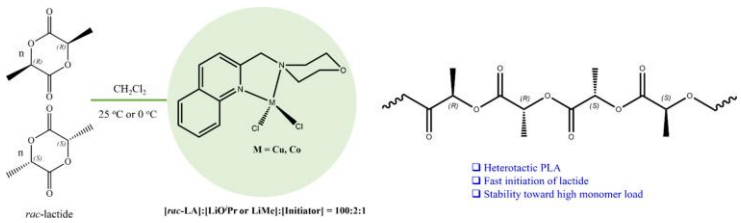
Three-component nanomaterials composed of Cu_2O, Cu, and TiO_2 were prepared using above procedures, and applied in the photocatalytic degradation reaction of 4-nitrophenol under a simulated solar light. We found that it exhibited greater activity than the Cu_2O-Cu nanoparticles aggregates (NPAs), commercial TiO_2, and Cu_2O@TiO_2 NPAs.

Bull. Korean Chem. Soc. **2024**, *45*, 373-377. https://doi.org/10.1002/bkcs.12822

C

Highly active cobalt(II) and copper(II) complexes supported by aminomethylquinoline mediating stereoselective ring-opening polymerization of *rac*-lactide

Jaegyeong Lee, Saira Nayab, Ameet Kumar, Dongil Kim, Hyewon Jung, Sang-Ho Lee, Daeheum Cho, Hyosun Lee



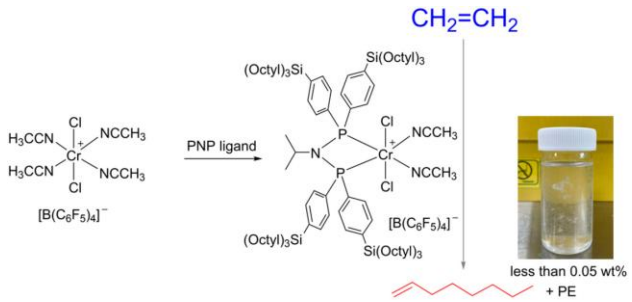
Cobalt(II) and copper(II) catalytic system for ring opening polymerization of *rac*-LA with quantitative initiation with [LiMe] and [LiO^{i}Pr] groups by an in situ activation strategy for stereoselective poly(lactide) synthesis. The cobalt(II)/LiMe initiating system produced PLA with high heterotactic enchainment (P_r = 0.92) with 98% conversion at 0 °C.

Bull. Korean Chem. Soc. **2024**, *45*, 317-321. https://doi.org/10.1002/bkcs.12828

A

Preparation of chromium complexes for ethylene tetramerization catalyst

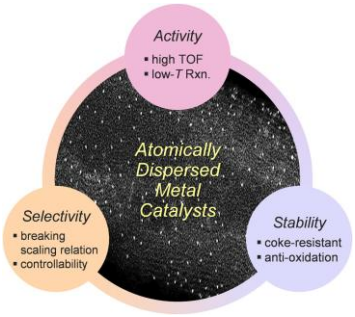
Jun Hyeong Park, Ju Yong Park, Jun Won Baek, Yeong Hyun Seo, Mi Ryu Lee, Junseong Lee, Bun Yeoul Lee



Bull. Korean Chem. Soc. **2024**, *45*, 331-340. https://doi.org/10.1002/bkcs.12826

P Rise of atomically dispersed metal catalysts: Are they a new class of catalysts?

Jae Hyung Kim, Sang Hoon Joo

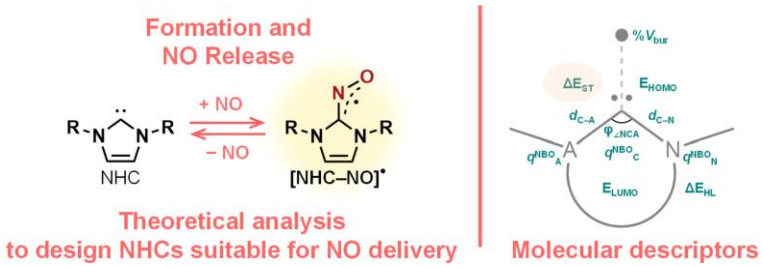


This account presents the historical background underpinning the emergence of atomically dispersed metal catalysts and highlights selected examples illustrating their unusual catalytic reactivities, which are hard to be realize with homogeneous or heterogeneous catalysts.

Bull. Korean Chem. Soc. **2024**, *45*, 350-358. https://doi.org/10.1002/bkcs.12830

A Theoretical analysis on the formation and nitric oxide release of N-heterocyclic carbene nitric oxide radicals

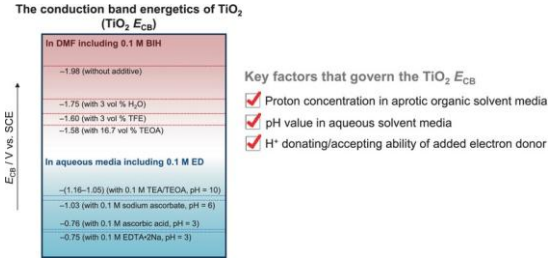
Junbeom Park, Hayoung Song, Yong Ho Lee, Eunsung Lee



Bull. Korean Chem. Soc. **2024**, *45*, 404-411. https://doi.org/10.1002/bkcs.12837

A Spectroelectrochemical determination of the conduction band level of mesoporous titanium dioxide semiconductor in diverse reaction media

Sunghan Choi, Chongoh Kim, Daehan Lee, Seungmin Jeon, Ho-Jin Son

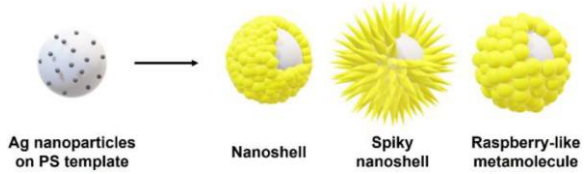


This study emphasizes the crucial role of proton additives and electron donors in influencing the conduction band energetics (E_{CB}) of mesoporous TiO_2 electrodes and aims to determine the extent to which the TiO_2 E_{CB} can shift as a result of the adsorption and intercalation of protons on its surface. The findings obtained herein contribute to the comprehension of the energetic efficiency of TiO_2-mediated photocatalytic systems in various solvent environments.

Bull. Korean Chem. Soc. **2024**, *45*, 412-419. https://doi.org/10.1002/bkcs.12839

P Gold nanoshells with varying morphologies through templated surfactant-assisted seed-growth method

Sunghee Lee, Soyun Lee, Soojin Hwang, So-Jung Park



The synthetic approach reviewed in this paper offers an alternative strategy to typical self-assembly methods for controlled assembly of metal nanoparticles. This method, based on templated seed-mediated metal growth, produces various types of metal nanoshells such as continuous or spiky nanoshells, as well as raspberry-like metamolecules with unique optical properties, including strong and distance-independent SERS, heterogeneity-driven quadrupole-enhanced SERS, and strong magnetic resonances with broad extinction spectra. This account discusses the factors that control the morphology and optical properties and suggests future directions in this field.

Bull. Korean Chem. Soc. **2024**, *45*, 486-494. https://doi.org/10.1002/bkcs.12845

A

Organometallic ruthenium complexes derived from anthracene and pyrene chromophores: Synthesis and photophysical properties

Gajendra Gupta, Yena Choe, Suhyun Kim, Junseong Lee, Jiwon Bang, Chang Yeon Lee

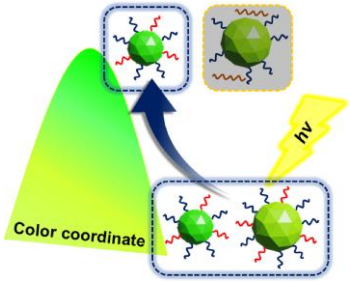
Synthesis and excellent photocatalytic properties of new ruthenium-based anthracene and pyrene complexes are presented.

Bull. Korean Chem. Soc. **2024**, *45*, 398-403. https://doi.org/10.1002/bkcs.12841

C

Narrowing the photoluminescence bandwidth of InP-based colloidal quantum dots through photon-triggered isolation

Hyekyeong Kwon, Byeong-Seo Cheong, Jiwon Bang



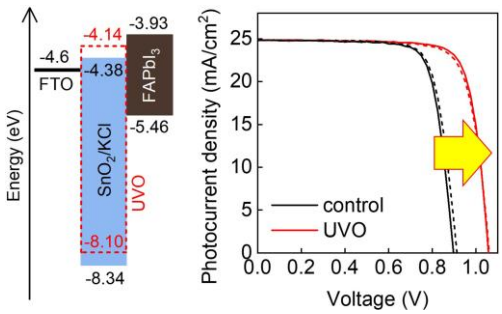
Thiol-functionalized quantum dots enable light-triggered ligand detachment. Selectively removing the light-activated quantum dots from a colloidal solution in an ensemble facilitates the isolation of quantum dots with a nearly monodispersed optical band gap distribution, resulting in narrowed and blueshifted emissions.

Bull. Korean Chem. Soc. **2024**, *45*, 530-534. https://doi.org/10.1002/bkcs.12847

A

Effect of UV-ozone treatment for KCl interlayer in perovskite solar cells

Na-Yeon Jo, Yun-Kyeong Hong, Sanghee Yang, Hui-Seon Kim

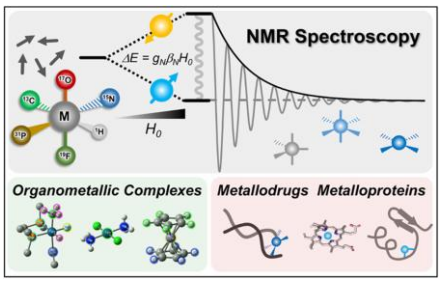


Bull. Korean Chem. Soc. **2024**, *45*, 570-575. https://doi.org/10.1002/bkcs.12851

R

NMR spectroscopic investigations of transition metal complexes in organometallic and bioinorganic chemistry

Jeongcheol Shin, Mi Hee Lim, Jiyeon Han

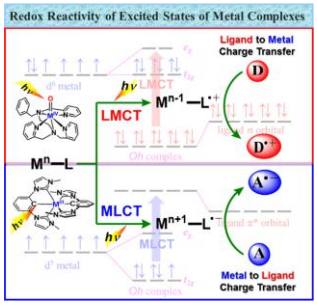


This review covers the applications of nuclear magnetic resonance (NMR) spectroscopy in analyzing transition metal complexes in organometallic and bioinorganic chemistry, with some examples. Enhancing our grasp of NMR spectroscopy coupled with coordination chemistry will enable chemists to decipher the geometric and electronic properties of transition metal complexes.

Bull. Korean Chem. Soc. **2024**, *45*, 593-613. https://doi.org/10.1002/bkcs.12853

R Redox reactivity of LMCT and MLCT excited states of earth-abundant metal complexes

Wonwoo Nam, Yong-Min Lee, Shunichi Fukuzumi

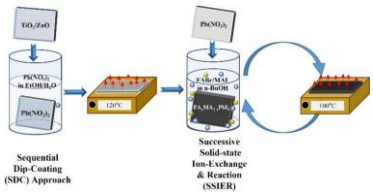


This review focuses on redox reactivity of metal-to-ligand charge transfer (MLCT) and ligand-to-metal charge transfer (LMCT) excited states of earth-abundant metal complexes, such as iron, manganese, cobalt and chromium complexes, together with the lifetimes and redox potentials of the MLCT and LMCT excited states, which are different depending on metals, ligands and Lewis acids bound to ligands.

Bull. Korean Chem. Soc. **2024**, *45*, 503-519. https://doi.org/10.1002/bkcs.12850

A Sequential-dip-coating processed mixed organic and inorganic perovskite film from halide-free lead precursor for efficient perovskite solar cells

Zobia Irshad, Muhammad Adnan, Ho-Joong Kim, Jae Kwan Lee

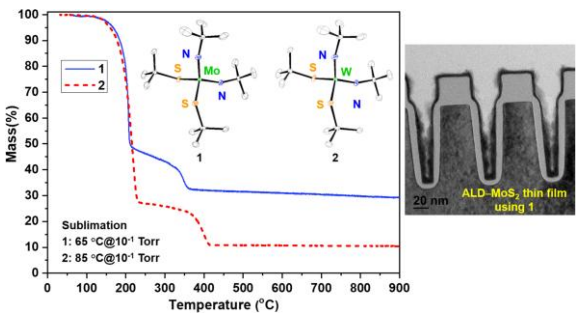


The development of $FA_1MA_{1-y}PbI_{3-x}Br_x$ perovskite films through an all-sequential-dip-coated (SDC) deposition method marks a significant advancement in the field of perovskite solar cells (PrSCs). This novel approach utilizes an aqueous non-halide lead precursor, promoting an environmentally friendly and cost-effective alternative to traditional methods. The strategic modulation of FABr concentration in the precursor solution enables precise control over the bromine content within the perovskite crystal lattice, enhancing surface coverage and crystallinity. Such improvements are crucial for achieving high device performance and stability. The SDC method not only demonstrates increased efficiency due to the use of benign solvents but also shows promise for scaling up to large-area PrSC devices, overcoming limitations associated with conventional spin-casting techniques. This innovative synthesis strategy could potentially lead to more sustainable and scalable production of high-performance PrSCs, contributing to the advancement of solar energy technology.

Bull. Korean Chem. Soc. **2024**, *45*, 631-638. https://doi.org/10.1002/bkcs.12882

A Synthesis and characterization of Mo and W compounds for disulfide materials

Sunyoung Shin, Seongmin Yeo, So Jeong Yeo, Taek-Mo Chung, Chang Gyoun Kim, Bo Keun Park

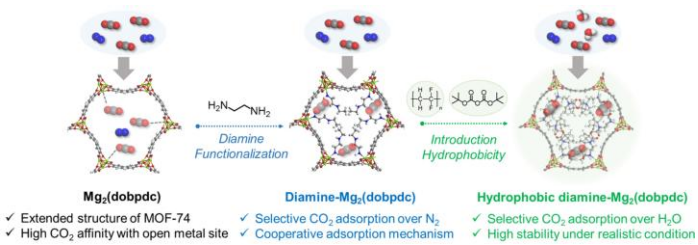


Imido/thiolate compounds **1** (Mo) and **2** (W) have distorted tetrahedral geometries. The TGA of **1** and **2** exhibited a two-step weight loss, and the residue of **1** was assumed to be MoS_2; however, **2** was well-vaporized before decomposition. The compounds were sufficiently vaporized to be used for the thin film deposition of metal chalcogenides. Atomic layer deposition confirmed that **1** effectively formed a MoS_2 thin film between 250 and 350 °C.

Bull. Korean Chem. Soc. **2024**, *45*, 576-583. https://doi.org/10.1002/bkcs.12880

P Post-synthetic modifications of MOF-74 type frameworks for enhancing CO_2 capture and moisture stability

Jintu Francis Kurisingal, Jong Hyeak Choe, Hyojin Kim, Jeongwon Youn, Gayoung Cheon, Chang Seop Hong

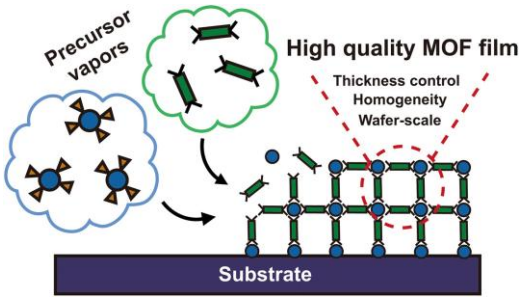


Diamine-modified MOF-74 type frameworks show impressive CO_2 capacities, but struggle with stability in humid conditions, affecting recyclability. To overcome this, exploring the incorporation of diamines onto open metal sites, followed by post-synthetic functionalization with hydrophobic moieties to enhance water stability and overall performance.

Bull. Korean Chem. Soc. **2024**, *45*, 675-688. https://doi.org/10.1002/bkcs.12885

R Vapor-phase synthesis of MOF films

Myeonggeun Choe, Hyeonwoo Lee, Hee Cheul Choi

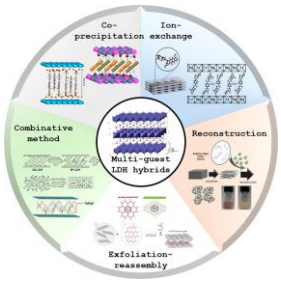


This review highlights two leading vapor-phase synthesis techniques for metal–organic framework (MOF) thin films: molecular layer deposition (MLD) and chemical vapor deposition (CVD).

Bull. Korean Chem. Soc. **2024**, *45*, 584-592. https://doi.org/10.1002/bkcs.12854

R Supramolecular chemistry for the incorporation of multi-guest molecules into two-dimensional metal hydroxide hosts

Taeho Kim, Jin Kuen Park, Jae-Min Oh

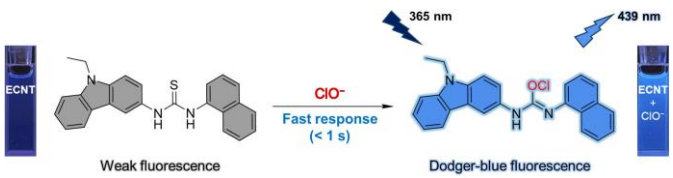


The immobilization of multi-guest in the interlayer space of LDH has been widely studied for their synergetic performances via guest-guest interaction. In this review, we have summarized the supramolecular chemistry providing rationales to control guest-guest interaction and to select an appropriate synthetic method. This study will provide strategies to enhance properties of materials that are useful for a variety of applications.

Bull. Korean Chem. Soc. **2024**, *45*, 724-737. https://doi.org/10.1002/bkcs.12895

A A novel thiourea-based fluorescent turn-on sensor for rapidly detecting hypochlorite through a desulfurization reaction

Boeun Choi, Soyeon Kim, Cheal Kim

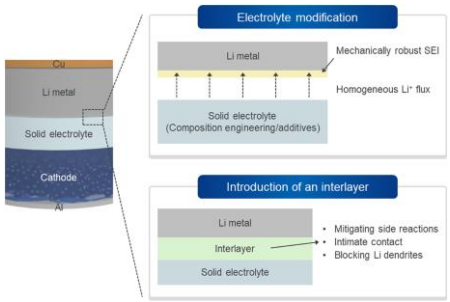


A novel thiourea-based fluorescent turn-on sensor 1-(9-ethyl-9*H*-carbazol-3-yl)-3-(naphthalen-1-yl)thiourea was developed for recognizing ClO^- with a significantly fast response time (<1 s) through a desulfurization reaction. The response mechanism of 1-(9-ethyl-9*H*-carbazol-3-yl)-3-(naphthalen-1-yl)thiourea to ClO^- was demonstrated through ^1H NMR titration, ESI mass, and density functional theory calculations.

Bull. Korean Chem. Soc. **2024**, *45*, 795-801. https://doi.org/10.1002/bkcs.12897

R Interfacial challenges and recent advances of solid-state lithium metal batteries

Wooyoung Jeong, Jonghyeok Yun, Jong-Won Lee

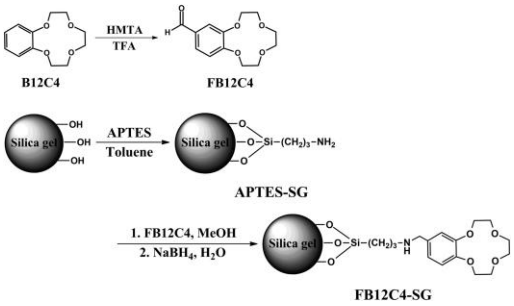


This study reviews various solid electrolytes with high Li^+ conductivity and their interfacial issues in solid-state lithium metal batteries. Furthermore, recent advances in strategies to stabilize the interface between the lithium anode and solid electrolytes are also provided, in terms of the electrolyte modification and introduction of an interlayer.

Bull. Korean Chem. Soc. **2024**, *45*, 806-820. https://doi.org/10.1002/bkcs.12900

A Synthesis of benzo-12-crown-4 ether immobilized silica for lithium-ion adsorption

Yun-Gyeong Jeong, Che-Ryong Lim, Yong-Bok Na, Yeoung-Sang Yun, Se-Jung Kim, Youn-Sik Lee

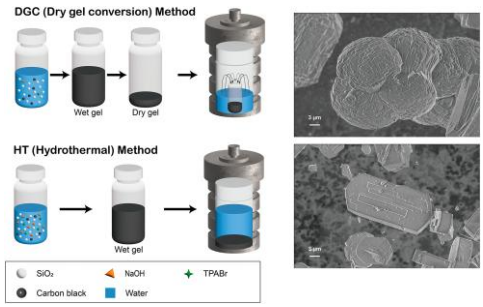


A B12C4-immobilized silica adsorbent (FB12C4-SG) was synthesized, and its Li^+ adsorption reached equilibrium after 2 h, with a maximum adsorption of 31 mg g^{-1} and Li^+/Na^+ adsorption selectivity factor of 4.2.

Bull. Korean Chem. Soc. **2025**, *46*, 69-76. https://doi.org/10.1002/bkcs.12926

C Synthesis of MFI zeolites with hierarchical porosity by dry-gel conversion

Susung Kim, Seunghwan Kim, Hae Sung Cho

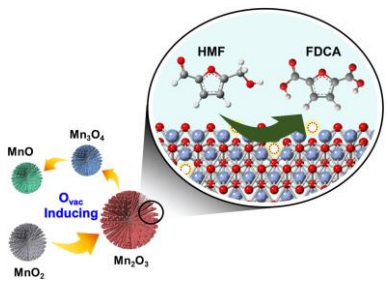


Hierarchical MFI zeolites were successfully synthesized via dry-gel conversion (DGC) using carbon black as a hard template. The optimal conditions for zeolite synthesis using the DGC method were determined by systematically controlling the amounts of base and organic templates in the zeolite precursor dry-gel.

Bull. Korean Chem. Soc. **2025**, *46*, 35-41. https://doi.org/10.1002/bkcs.12919

C Strategies to increase catalytic efficiency of manganese-catalyzed aerobic oxidation of 5-hydroxymethylfurfural

Hyejin Yu, Yeonkyeong Ryu, Younghoon Kim, Hyun Sung Kim, Hyun Gil Cha

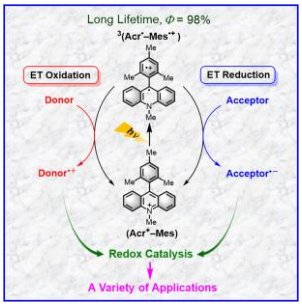


Among Mn-based oxides (i.e., MnO_2, Mn_2O_3, Mn_3O_4, and MnO), Mn_2O_3 exhibited the best performance, indicating the synergetic effects of the oxidation state of the central metal, basicity of catalyst and solution, and catalyst oxygen mobility.

Bull. Korean Chem. Soc. **2025**, *46*, 42-47. https://doi.org/10.1002/bkcs.12925

R Photoredox catalysis of acridinium and quinolinium ion derivatives

Shunichi Fukuzumi, Yong-Min Lee, Wonwoo Nam



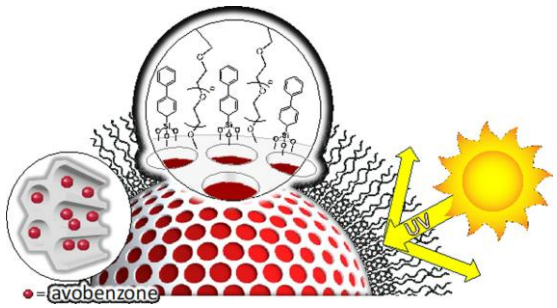
This review focuses on photoredox properties of acridinium and quinolinium ion derivatives. In particular, the excellent photoredox properties of 9-mesityl-10-methylacridinium ion (Acr^+–Mes) have been shown in comparison with those of other photoredox catalysts. Various applications of Acr^+–Mes as one of the best photoredox catalysts are discussed, including PSI model reactions and the combination of PSI and PSII model reactions to achieve the stoichiometry of photosynthesis. Immobilization of photoredox catalysts is also discussed for the further applications.

Bull. Korean Chem. Soc. **2025**, *46*, 4-23. https://doi.org/10.1002/bkcs.12922

A

Development of biocompatible mesoporous silica materials for enhanced UV protection

Suk Joong Lee, Young Jae Lee, Ji Yea Lee, Young Sok Yun, Tae Keun Kwon, Inhong Jung



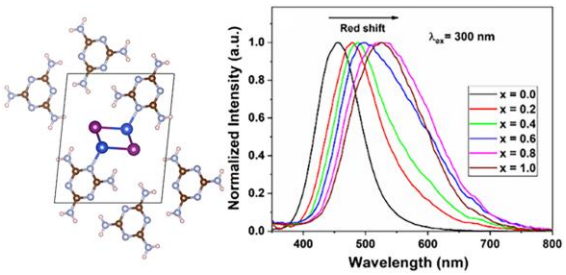
A new biocompatible mesoporous silica materials for ultraviolet (UV) protection was developed, featuring avobenzone encapsulation and surface modifications that enhance UV absorption and blocking. In vivo tests on nude mice showed that treated skin was significantly thinner and did not experience sunburn-related thickening, unlike untreated skin.

Bull. Korean Chem. Soc. **2025**, *46*, 138-144. https://doi.org/10.1002/bkcs.12934

A

Crystal structure and photoluminescence properties of $CuBr_xI_{1-x}$(melamine) ($0 \le x \le 1$) complexes

Juhyun Kim, Donghyeon Kim, Fouzia Khefif, Woojin Yoon, Hoseop Yun, Chung-Yul Yoo, Seung-Joo Kim



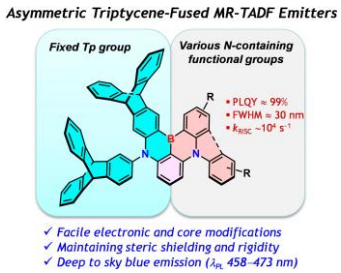
This study investigates the crystal structure and photoluminescence properties of $CuBr_xI_{1-x}$(melamine) ($0 \le x \le 1$), where copper(I) is coordinated with three halides and a single melamine ligand, forming an infinite stair-step chain structure. The emission peaks of $CuBr_xI_{1-x}$(melamine) show a red shift as the proportion of Br increases relative to I.

Bull. Korean Chem. Soc. **2025**, *46*, 164-170. https://doi.org/10.1002/bkcs.12938

A

Manipulating photophysical properties through asymmetric modification of triptycene-fused multi-resonance TADF emitter

Hanif Mubarok, Rafi Muhammad Lutfi, Jaemin Yun, Jaehoon Jung, Min Hyung Lee



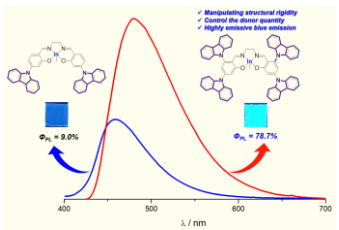
Asymmetric bulky multi-resonance emitters based on a triptycene-fused B,N core were developed. By incorporating different *N*-containing functional groups, the emission was tuned from deep blue to sky blue while retaining excellent photophysical properties, including a high photoluminescence quantum yield, narrow full width at half maximum, and thermally activated delayed fluorescence characteristics.

Bull. Korean Chem. Soc. **2025**, *46*, 171-177. https://doi.org/10.1002/bkcs.12939

A

Highly blue-emissive CBZ-functionalized salen–In complexes: Influence of structural rigidity and donor substituent quantity

Yoseph Kim, Jaehoon Kim, Ji Hye Lee, Hyeongkwon Moon, Hyonseok Hwang, Junseong Lee, Houng Kang, Jun Hui Park, Youngjo Kim, Myung Hwan Park



4-CBZ- and 4,6-di-CBZ-functionalized salen–indium complexes were prepared to elucidate the effect of the substituents number and structural rigidity on photophysical properties. Among them, 4,6-di-CBZ-substituted salen–In complex exhibited strong blue emission with the PLQY of 78.7% in a PMMA film.

Bull. Korean Chem. Soc. **2025**, *46*, 186-192. https://doi.org/10.1002/bkcs.12945

A

Tuning mechanoluminescence colors from aromatic imides with dyes

Seunghui Lee, Jeonghoon Jang, Gyeonghun Kim, Jiwon Bang, Gregory I. Peterson

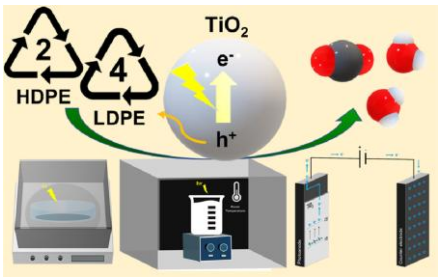
The color of mechanoluminescent emission from aromatic imides is tuned by mixing with organic dyes, providing a simpler approach than the chemical synthesis routes that were previously employed to tune the mechanoluminescence behavior. This method is also applicable to composite materials using waste polystyrene.

Bull. Korean Chem. Soc. **2025**, *46*, 310-316. https://doi.org/10.1002/bkcs.12944

R

Recent advances and protocol summaries for degradation of polyethylene microplastics using TiO_2-based photocatalysts

Yu Jin Jung, In Young Kim



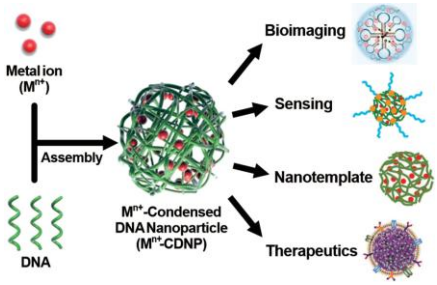
The photocatalytic mineralization of PE MPs using photocatalysts such as TiO_2 is an effective approach to mitigating the potential risks of MPs and reducing the growing accumulation of plastic waste. This review explores recent advances in the photocatalytic degradation of PE, compares degradation efficiencies across different photocatalytic systems, and summarizes protocols for these reactions.

Bull. Korean Chem. Soc. **2025**, *46*, 198-210. https://doi.org/10.1002/bkcs.70004

R

Metal ion (M^{n+})-condensed DNA nanoparticles: Synthesis, properties, and applications

Jeesu Moon, Sang-Won Kim, Jae-Seung Lee



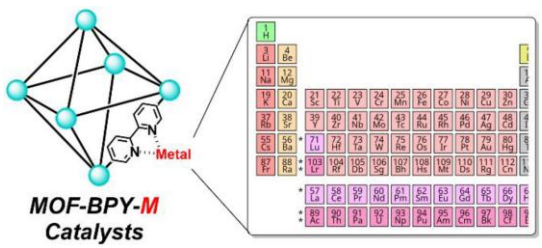
Metal ion (M^{n+})-condensed DNA nanoparticles (M^{n+}-CDNPs) have emerged as advanced compact polymeric nanostructures with unique chemical and physical properties enabling applications in biosensing, diagnostics, and therapy. While challenges such as scalability and biocompatibility persist, advancements in surface modification techniques and programmable DNA sequences continue to enhance their potential in nanomedicine and material design.

Bull. Korean Chem. Soc. **2025**, *46*, 221-230. https://doi.org/10.1002/bkcs.12942

R

Metalations on 2,2′-bipyridine-functionalized metal–organic frameworks for catalytic platforms

Jiwon Kang, Seungheon Cha, Jihun Ryu, Byeongho An, Chaewon Lim, Yoonji Heo, Isaac Choi, Min Kim



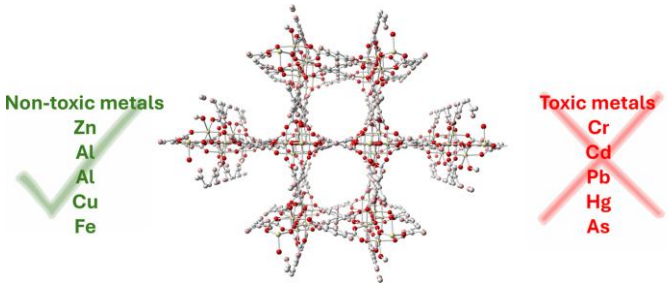
This review explores the integration of 2,2′-bipyridine (BPY) chelating moiety into metal–organic frameworks (MOFs), focusing on the coordination of secondary metal cations at BPY sites. It categorizes metals into first, second, and third-row transition metals, with key examples such as Pd, Mo, Cu, and Fe. Strategies for metalation, including pre-functionalization and post-synthetic modification of BPY, are discussed, along with the stability of Zr-based MOFs and their overall performance in catalytic applications.

Bull. Korean Chem. Soc. **2025**, *46*, 231-252. https://doi.org/10.1002/bkcs.70000

R

Low-toxicity metal–organic frameworks: Sustainable solutions for versatile applications

Juan L. Obeso, Catalina V. Flores, Aldo G. Gutiérrez, Carolina Leyva, Juan Carlos Valdivia-Corona, Leonardo D. Herrera-Zúñiga, José Antonio de los Reyes, Ricardo A. Peralta, Ilich A. Ibarra



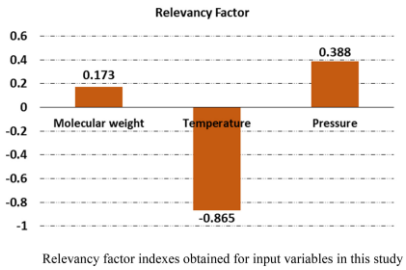
Developing low-toxicity Metal-organic Frameworks (MOFs) involves challenges related to stability, scalability, and cost-effectiveness. Research now focuses on improving MOF design to enhance robustness and exploring greener synthesis methods to minimize environmental impact.

Bull. Korean Chem. Soc. **2025**, *46*, 265-280. https://doi.org/10.1002/bkcs.70005

A

Accurate estimation of polyethylene glycol density via machine-learning based techniques

Farag M. A. Altalbawy, Iman Samir Alalaq, Safaa Mohammed Ibrahim, Krunal Vaghela, Adam Amril Jaharadak, Priyanka Singh, Kiranjeet Kaur, Forat H. Alsultany, Safaa Mustafa Hameed, Usama S. Altimari, Mohammed Al-Farouni, Mahmood Kiani



Relevancy factor indexes obtained for input variables in this study

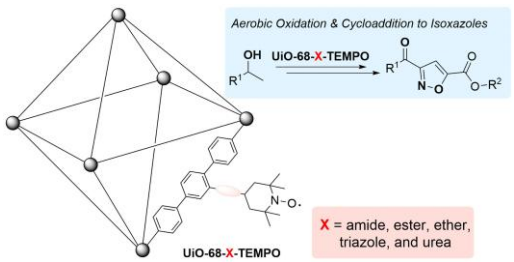
Relevancy factor indexes obtained for input variables in this study.

Bull. Korean Chem. Soc. **2025**, *46*, 429-440. https://doi.org/10.1002/bkcs.70012

A

Derivatizing immobilization methods for TEMPO radicals in metal–organic frameworks: Toward efficient aerobic oxidation and sequential reactions

Seungheon Cha, Daeyeon Lee, Jiwon Kang, Jonghyeon Lee, Seongwoo Kim, Houng Kang, Soyoung Park, Min Kim



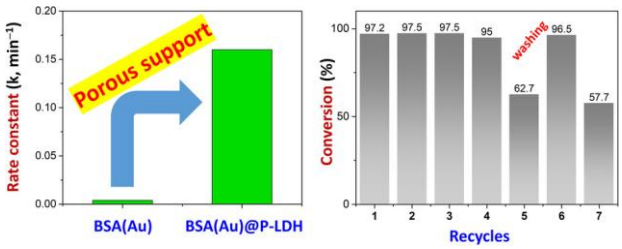
Covalent attachment of TEMPO radicals to Zr-based metal–organic frameworks (MOFs) was achieved by diversifying linker structures, enabling efficient aerobic oxidation of secondary alcohols. The modified MOFs facilitated sequential reactions, including isoxazole synthesis via aerobic oxidation and cycloaddition, demonstrating their versatility and potential in tandem catalytic processes.

Bull. Korean Chem. Soc. **2025**, *46*, 468-480. https://doi.org/10.1002/bkcs.70019

A

Bovine-serum-albumin-stabilized Au nanocluster/porous layered double hydroxide hybrid catalyst with enhanced efficiency and reusability

Soo Yeon Kim, Hankyeol Bae, Sunglun Kwon, Jong Hyeon Lee

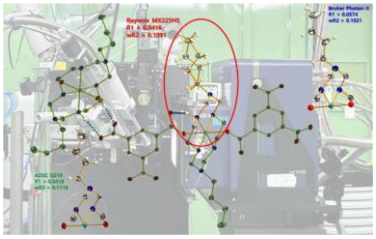


This study used porous LDH to enhance catalytic performance by facilitating the incorporation of BSA(Au) particles, preventing aggregation, and improving mass transport, thereby dramatically increasing reaction efficiency and stability in the hydrogenation of *p*-nitrophenol under $NaBH_4$.

Bull. Korean Chem. Soc. **2025**, *46*, 587-593. https://doi.org/10.1002/bkcs.70033

P BL2D-SMC: The versatile chemical crystallography beamline at PLS-II, Korea

Jong Won Shin, Dae-Woong Kim, Dongwon Kim, Dohyun Moon

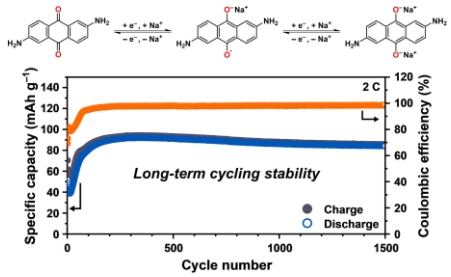


We compared the resolution and quality of data collected by BL2D-SMC and a commercial machine, Bruker Photon II, using the reported nickel(II) azamacrocyclic complex (**A**). The $F_o - F_c$ maps of anions and butyl pendent groups in **A** were not sufficient for additional detailed refinement with both Bruker Photon II and the older ADSC Q210 CCD detector in BL2D-SMC. However, the latest Rayonix MX225HS detector in BL2D-SMC exhibited large positive $F_o - F_c$ maps of anions and butyl pendent groups in **A** compared to both the older ADSC Q210 CCD detector and the Bruker Photon II machine and was suitable for additional refinement to solve the disorder problem in **A**.

Bull. Korean Chem. Soc. **2025**, *46*, 594-601. https://doi.org/10.1002/bkcs.70021

A Fast and stable cycling of 2,6-diaminoanthraquinone as a redox-active organic cathode for sodium-ion batteries

Honggyu Seong, Youngseok Chang, Jaewon Choi

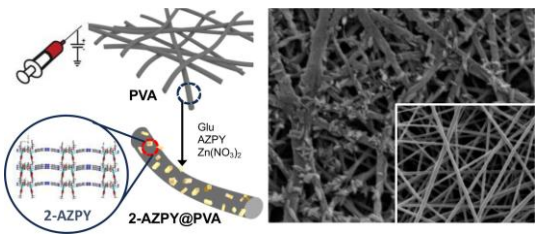


This study explores 2,6-diaminoanthraquinone (2,6-DAAQ) as a redox-active organic cathode material for sodium-ion batteries. Its Na^+ ion storage mechanism is demonstrated via electrochemical analysis, ex situ ATR FT-IR, and DFT calculations, revealing excellent rate capability and long-term cycling stability based on dominant capacitive behavior.

Bull. Korean Chem. Soc. **2025**, *46*, 666-672. https://doi.org/10.1002/bkcs.70038

A Zn-MOFs incorporating 1,2-*bis*(4-pyridyl)ethylene and 4,4'-azopyridine: Unlocking new frontiers in antifungal research

Seo Yeon Heo, Dae Yong Kim, Young Sok Yun, Tae Keun Kwon, Inhong Jung, Young Jae Lee, Youngmee Kim, Suk Joong Lee

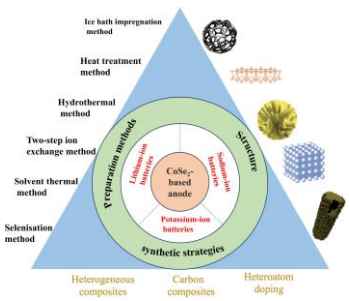


Zn-MOFs containing glu and bpe (**1-bpe**) and AZPY (**2-AZPY**) were prepared and their antifungal properties were tested. The inactivation ratio of **2-AZPY** against *A. niger* was 95% and that of **1-bpe** was 5%. **2-AZPY** can inactivate *A. niger, not C. cladosporioides* and *C. albicans*. The released AZPY from Zn-MOF can deactivate fungal cells by interacting with thiol groups of proteins to produce SS coupling. Embedding 2-AZPY in a PVA nanofiber matrix further enhanced antifungal performance, demonstrating its potential in medical and environmental applications.

Bull. Korean Chem. Soc. **2025**, *46*, 743-753. https://doi.org/10.1002/bkcs.70037

R Research progress of cobalt selenide anode materials for metal-ion battery

Jiaxin Guo, Hongsheng Jiang, Shengkai Li, Jinliang Lin, Donghui Liu, Qi Wang, Bin Feng

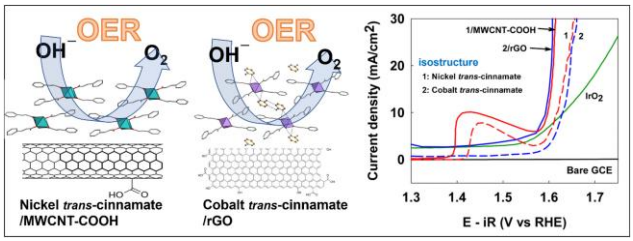


Schematic review: synthesis method and modification strategy of $CoSe_2$ as an anode material for metal-ion batteries.

Bull. Korean Chem. Soc. **2025**, *46*, 704-729. https://doi.org/10.1002/bkcs.70043

A Electrocatalytic activity of nickel and cobalt cinnamate for oxygen evolution reaction with reduced graphene oxide or carbon nanotube

Jimin Lee, Sunwoo Geum, Jiehye Shin, Hyewon Shin, Sun Jun Jin, Jaedo Na, Minkyun Shin, Junghwan Do, Seong Jung Kwon, Sumin Lee

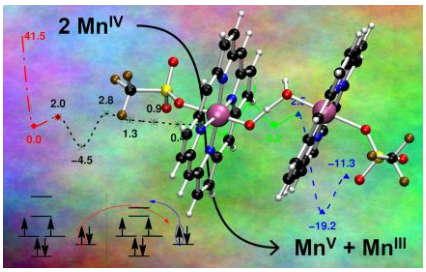


Ni and Co trans-cinnamate coordination polymers (CPs) exhibit enhanced oxygen evolution reaction (OER) performance when supported on carbon materials. Notably, Ni *t-ca*/MWCNT-COOH and Co *t-ca*/rGO reduce overpotentials by ~20 and 35 mV, respectively, due to π–π interactions and hydrogen bonding between the CPs and supports, demonstrating the potential of tailored CP-support interactions for electrocatalysis.

Bull. Korean Chem. Soc. **2025**, *46*, 813-820. https://doi.org/10.1002/bkcs.70052

C A theoretical study on the acid-catalyzed disproportionation reaction of a Mn(IV)-oxo porphyrin complex

Steiny Russelisaac Premakumari, Yunhee Choi, Maggie Ng, Vandana Kardam, Wonwoo Nam, Kyung-Bin Cho

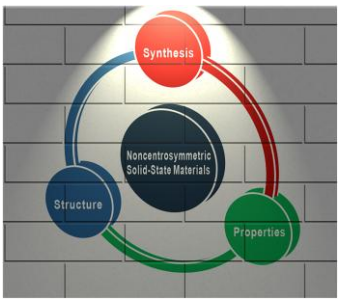


How do disproportionation reactions occur in high-valent metal-oxo species? We aim to describe the reaction mechanism of how a synthetic $Mn^{IV}O$-porphyrin species disproportionates to a formal Mn^{V} and Mn^{III} species, using density functional theory.

Bull. Korean Chem. Soc. **2025**, *46*, 784-790. https://doi.org/10.1002/bkcs.70049

R Structure–property relationships in noncentrosymmetric solid-state materials

Yeongseop Kim, Youngbin Chae, Hyungjin Lim, Kang Min Ok

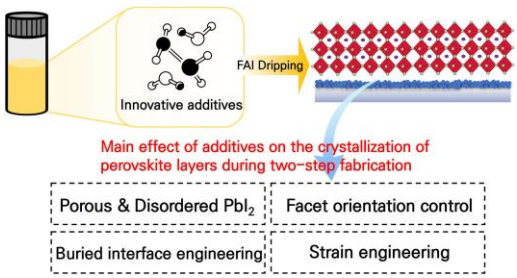


This tutorial review explores how diverse synthetic strategies and asymmetric structural motifs in noncentrosymmetric (NCS) materials drive nonlinear optical and photonic responses. By correlating structure with functional properties across representative compounds, it offers a practical guide to designing advanced NCS materials through solid-state chemistry.

Bull. Korean Chem. Soc. **2025**, *46*, 846-858. https://doi.org/10.1002/bkcs.70058

R Recent progress in two-step fabricated perovskite solar cells using additive engineering

Hyunjun Lee, Juhwan Lee, Jangwon Seo

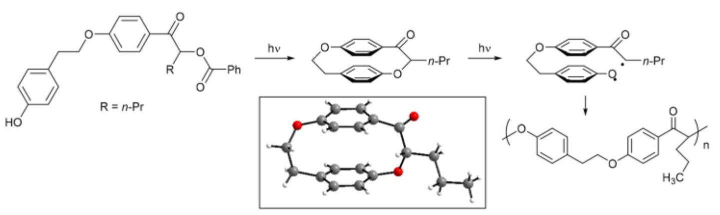


Additive engineering in two-step perovskite fabrication enabled a high quality of perovskite film with preferred crystal orientation, defect-less interfaces, and reduced strain of the crystal lattice. This review presents recent approaches that regulate the kinetics of crystal growth and control the bulk and interface defects of the perovskite layer via additive engineering for high-performance perovskite solar cells.

Bull. Korean Chem. Soc. **2025**, *46*, 940-956. https://doi.org/10.1002/bkcs.70060

C Synthesis and photochemistry of new chiral keto[3,3]cyclophanes

Ho Suk Shin, Bong Ser Park

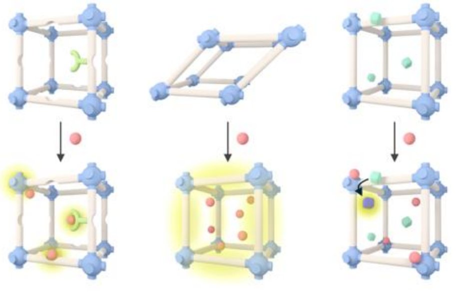


Racemates of chiral keto[3,3]cyclophanes are synthesized by the irradiation of the corresponding phenacyl benzoates tethered with a phenol moiety, and photolysis of the new cyclophanes results in the β CO bond cleavage as the major reaction pathway.

Bull. Korean Chem. Soc. **2025**, *46*, 1009-1013. https://doi.org/10.1002/bkcs.70068

R Recent advances on MOF-based colorimetric sensors

Solmin Lee, Hyejin Yoo, Jin Yeong Kim

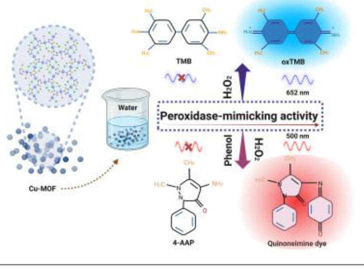


MOF-based colorimetric sensors are widely explored due to their operational simplicity and outstanding structural tunability. In this review, the recent progress of MOF-based colorimetric sensors is discussed, focusing on the role of MOFs in chromogenic transduction pathways.

Bull. Korean Chem. Soc. **2025**, *46*, 918-939. https://doi.org/10.1002/bkcs.70066

A Highly stable enhanced peroxidase-like new metal–organic framework for the colorimetric detection of phenol and hydrogen peroxide

Viktoriya Kim, Dong Woo Lee, Hye Ran Noh, Jong-Yun Kim, Tung Cao-Thanh Pham, Sang Ho Lim, Hyun Sung Kim

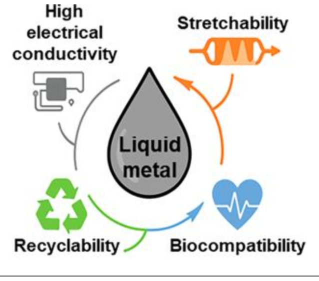


A novel Cu-based metal–organic framework (MOF) shows excellent peroxidase-like activity for colorimetric detection of phenol and hydrogen peroxide in water. It outperforms horseradish peroxidase (HRP), with superior kinetics and low detection limits of 0.13 μM for H_2O_2 and 0.07 μM for phenol, demonstrating strong potential for environmental monitoring.

Bull. Korean Chem. Soc. **2025**, *46*, 957-967. https://doi.org/10.1002/bkcs.70063

R Recent advances of gallium-based liquid metals: Properties, patterning strategies, and applications in soft electronics

Seung-Beom Shin, Jae-Hyeok Cho, Tae-Woo Lee, Ji-Won Park, Myung-Gil Kim



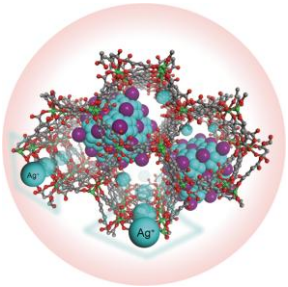
Gallium-based liquid metals combine high electrical conductivity, stretchability, recyclability, and biocompatibility, offering unique advantages for emerging soft and flexible electronics. This review highlights their fundamental properties, patterning challenges, and advanced device integration strategies.

Bull. Korean Chem. Soc. **2025**, *46*, 978-993. https://doi.org/10.1002/bkcs.70070

A

Encapsulation of AgI nanoparticles in a 2D Ti-based metal–organic framework for porous Ag^+ conductive composite

Ha-Eun Shin, Seon Haeng Yi, Dae-Woon Lim



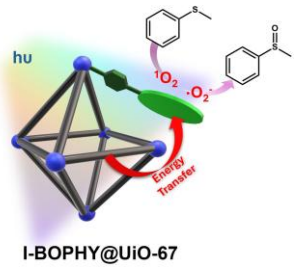
A porous Ag^+ ionic conductor was synthesized by encapsulating AgI nanoparticles within a 2D Ti-dobdc MOF. The incorporation enabled tunning of the phase transition temperature of polymorphic AgI, stabilizing superionic conductive α-phase while simultaneously enhancing the ionic conductivity of Ti-dobdc by six orders of magnitude. This study offers a design strategy for porous Ag^+ ion conductors.

Bull. Korean Chem. Soc. **2025**, *46*, 1143-1152. https://doi.org/10.1002/bkcs.70074

A

Post-synthetic anchoring of an iodinated BOPHY photosensitizer into defect-engineered UiO-67 for enhanced photocatalytic oxidation

Yena Choe, Yun Yeong Choe, Gi Hyeok Park, Tra Phuong Trinh, Gajendra Gupta, Hyejeong Park, Changmin Lee, Chang Yeon Lee



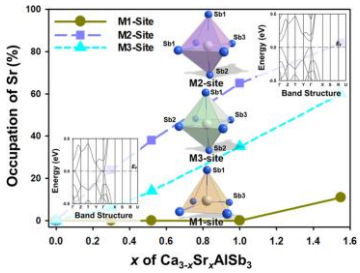
An iodinated BOPHY ((bis(difluoroboron)-1,2-bis((1*H*-pyrrol-2-yl)methylene)hydrazine)) photosensitizer was anchored into a defect-engineered UiO-67 metal–organic framework, creating a highly efficient and selective photocatalyst for sulfide oxidation driven by an effective framework-to-ligand energy transfer mechanism.

Bull. Korean Chem. Soc. **2025**, *46*, 1153-1160. https://doi.org/10.1002/bkcs.70080

A

Tunable bandgap and ultra-low thermal conductivity of the Sr/Zn co-substituted Ca_3AlAs_3-type Zintl phase

Donghwan Seo, Junsu Lee, Aziz Ahmed, Myung-Ho Choi, Kang Min Ok, Tae-Soo You



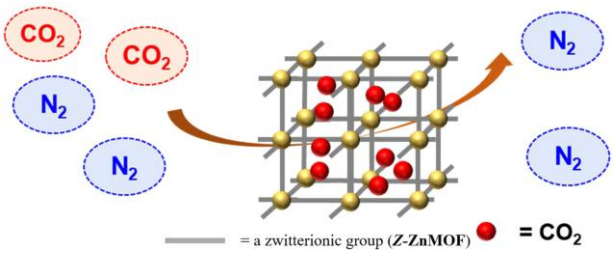
The Sr and Zn co-substituted $Ca_{3-x}Sr_xAl_{1-y}Zn_ySb_3$ system showed the particular site-preference of substituents governed by the size-factor, where the larger Sr preferentially occupied the largest site. This selective substitution directly altered the electronic structure resulting in an increase of the bandgap, which became eventually an effective strategy for enhancing thermoelectric efficiency.

Bull. Korean Chem. Soc. **2025**, *46*, 1161-1173. https://doi.org/10.1002/bkcs.70075

A

Efficient CO_2/N_2 selective adsorption using benzenedipyrazolate-based metal–organic frameworks (BDP-MOFs)

Younggyu Seo, Sejin Park, Gyuhyeong Lee, Jonghyeok Park, Hyunchul Oh, Eunsung Lee



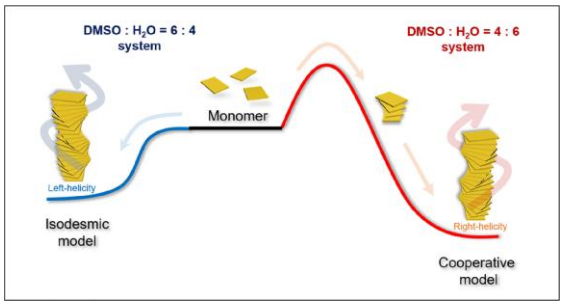
Zn-based BDP MOFs functionalized with imidazole and zwitterionic groups show high CO_2/N_2 selectivity under power plant and direct air capture conditions, with distinct adsorption behaviors driven by functional group integration, highlighting their potential for efficient gas separation and storage applications.

Bull. Korean Chem. Soc. **2025**, *46*, 1136-1142. https://doi.org/10.1002/bkcs.70077

A

Influence of ligand substituents on the chirality of metallosupramolecular architectures

Minju Nam, Sehee Kim, Kayoung Kim, Jong Hwa Jung



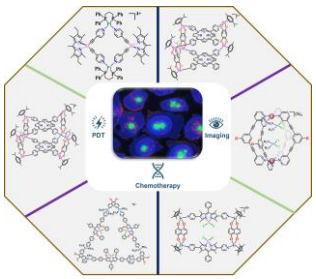
Terpyridine-based Pt(II) complex generates chiral metallosupramolecular polymers through composition-dependent mechanisms in DMSO/H_2O mixtures; this dependence arises from variations in the energy barrier to the thermodynamically favored state.

Bull. Korean Chem. Soc. **2025**, *46*, 1205-1211. https://doi.org/10.1002/bkcs.70078

R

Biological insights into BODIPY and porphyrin-functionalized fluorescent metal–organic macrocycles

Gajendra Gupta, Abhishek Das, Chang Yeon Lee



A concise review of the biological applications of self-assembled, fluorescent metal-organic macrocycles incorporating BODIPY and porphyrin chromophores, focusing on design strategies, structure–property relationships, and biomedical relevance.

Bull. Korean Chem. Soc. **2025**, *46*, 1174-1185. https://doi.org/10.1002/bkcs.70072

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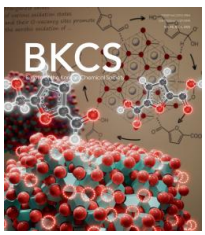

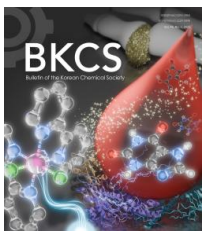

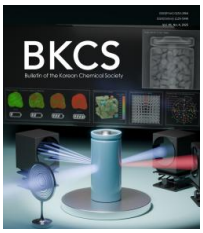

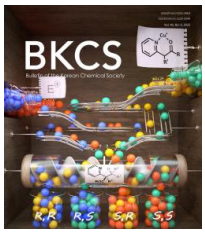

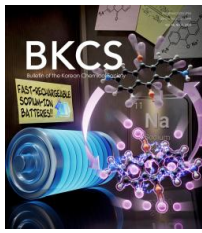

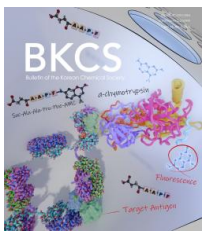

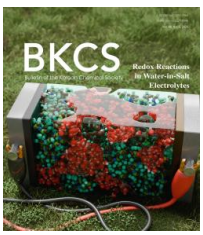

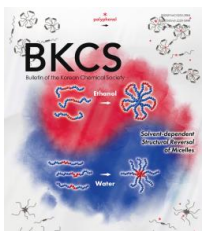

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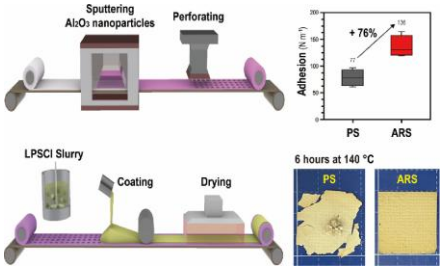
A

Surface modification of perforated separator for more robust and thinner all-solid-state electrolyte membrane

Dohwan Kim, Seungyeop Choi, Cheol Bak, Youngjoon Roh, Cyril Bubu Dzakpasu, Yong Min Lee



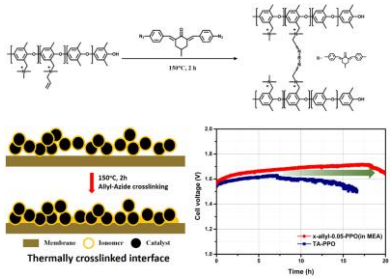
We propose a strategy for designing thin and robust solid electrolyte (SE) membranes with introducing adhesion-reinforced separator (ARS) as a supporting frame. The ARS-based SE membranes exhibit excellent thermal stability and high adhesion with SE composite. From a high ionic conductance made by thin thickness of 35 μm, the ARS-based SE membrane exhibits high-capacity and stable cycling in NCM||Li cells.

Bull. Korean Chem. Soc. **2024**, *45*, 341-349. https://doi.org/10.1002/bkcs.12829

A

Enhancing the durability of anion exchange membrane water electrolysis cells via interfacial membrane–ionomer crosslinking

Yerim Lee, Wooseok Lee, Tae-Hyun Kim



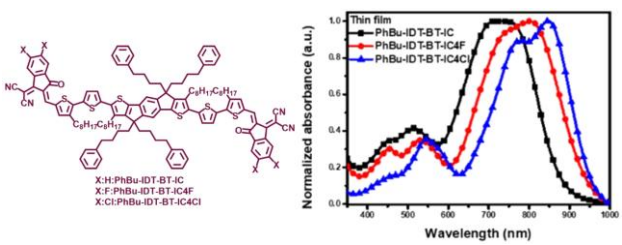
Enhance adhesion between membrane and catalyst-ionomer layer via crosslinking at the interface within the MEA improved the durability of the AEM-based water electrolysis.

Bull. Korean Chem. Soc. **2024**, *45*, 620-630. https://doi.org/10.1002/bkcs.12881

A

Novel low-band gap non-fullerene acceptors based on IDIC core as potential photovoltaic materials

Radhiha Ravindran, Inchan Kim, Yun-Hi Kim, Soon-Ki Kwon



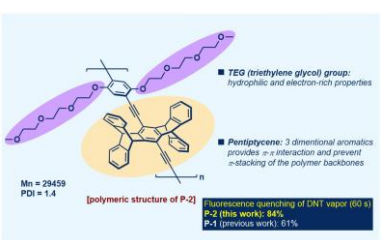
Low-band gap (LBG) polymers with absorption maximum exceeding 845 nm and onset of absorption ~960 nm have been designed and synthesized. The optical and thermal properties of these LBGs have been found to be influenced when the hydrogen atoms were substituted with either fluorine or chlorine atoms. The wide absorption both in the visible and in the near infrared regions makes these polymers as potential candidates for photovoltaic applications.

Bull. Korean Chem. Soc. **2024**, *45*, 788-794. https://doi.org/10.1002/bkcs.12891

A

Moisture-resistant nitroaromatic explosive gas sensor based on hydrophilic pentiptycene polymer

Gyeongsoo Kim, Sun Bu Lee, Jaeyoung Heo, Tae Eun An, Gang Min Lee, Junggong Kim, Keunyoung Kim, Jongman Lee, Han Yong Bae, Changsik Song

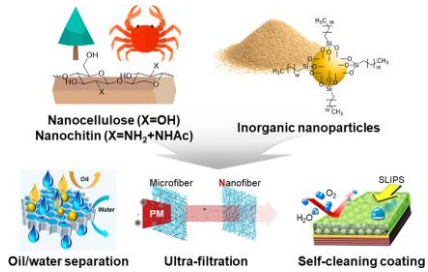


Detecting nitroaromatic explosives is crucial for public safety. Sensors utilizing fluorescence quenching are promising, but moist interference is problematic. We compare two pentiptycene-based polymers, P-1 and P-2, to detect explosives in humid atmospheres. A conjugated polymer P-2, incorporating triethylene glycol groups, exhibited better hydrophilicity and maintained over 90% sensitivity, outperforming P-1. Hence, P-2 has proved to be a better moisture-tolerant explosive sensor.

Bull. Korean Chem. Soc. **2024**, *45*, 828-834. https://doi.org/10.1002/bkcs.12902

R Recent advances in utilizing andsurface-features of naturally derived nanocellulose and nanochitin for self-cleaning purifying applications

Donggyu Lee, Jun Mo Koo, Yumi Cho, Jinsik Kim, Soyeon Kim, Dongyeop X. Oh, Hyeonyeol Jeon, Jeyoung Park

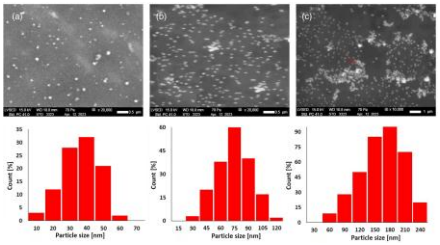


This review delves into the innovative use of naturally derived nanocellulose and nanochitin for self-cleaning and purification applications. Highlighting their chemical modifiability and integration with inorganic nanoparticles, it explores their potential in sustainable solutions for oil/water separation, ultrafiltration, and eco-friendly coatings, while addressing challenges in scalability.

Bull. Korean Chem. Soc. **2024**, *45*, 880-895. https://doi.org/10.1002/bkcs.12906

A Physicochemical characteristics of a nanocomposite film based on purified sodium carboxymethylcellulose and selenium nanoparticles

Khaydar Ergashovich Yunusov, Fozil Mamaraim Ugli Turakulov, Abdushkur Abdukhalilovich Sarymsakov, Sherzod Abdullaevich Yuldoshov, Sayyora Sharafovna Rashidova, Jiang Guohua

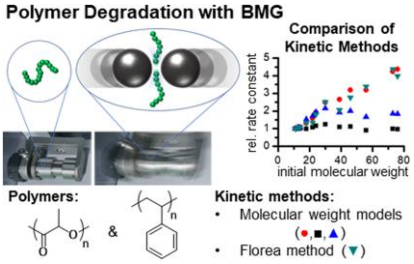


The nanocomposite film was obtained from purified sodium carboxymethylcellulose with degree of substitution 0.97 and degree of polymerization 810 and selenium nanoparticles (SeNPs) with different sizes. The atomic force microscopy and SEM results showed that the SeNPs were spherical with sizes 5–65, 30–120, and 60–240 nm in the structure of Na-CMC nanocomposite films. The nanoparticle size distribution was insignificantly unchanged over the probed holding period of 28 days, which confirmed the high stability of the SeNPs synthesized in the Na-CMC solutions.

Bull. Korean Chem. Soc. **2024**, *45*, 273-283. https://doi.org/10.1002/bkcs.12813

A Comparing kinetic methods for ball-mill grinding: Molecular weight versus refractive index-based methods

Somin Cha, Byeongyeol Park, Tae-Hyun Kim, Gregory I. Peterson

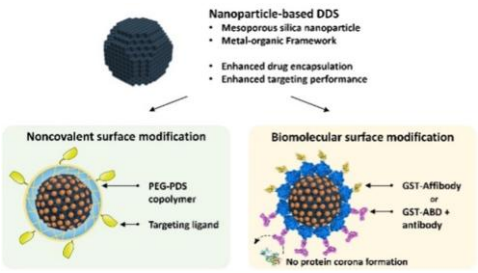


The kinetics of polystyrene and poly(lactide) degradation with ball-mill grinding are assessed by monitoring changes in molecular weight (molecular weight models) or refractive index (the Florea method) with increasing milling time. This work provides guidance on using these methods and highlights how the kinetic method employed significantly affects the observed rate constant trends.

Bull. Korean Chem. Soc. **2025**, *46*, 96-103. https://doi.org/10.1002/bkcs.12930

P Nanoparticle-based drug delivery system with enhanced loading and targeting performance: A brief account

Jun Yong Oh, Gyeongseok Yang, Eunshil Choi, Ja-Hyoung Ryu

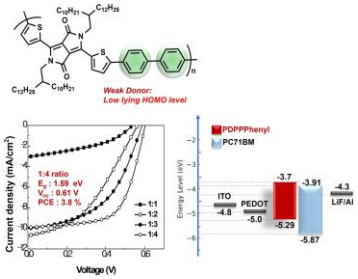


This paper reviews the recently reported novel strategies for the development of drug delivery systems with enhanced drug loading and targeting ability via noncovalent polymeric or biomolecular surface modification.

Bull. Korean Chem. Soc. **2025**, *46*, 104-115. https://doi.org/10.1002/bkcs.12931

A Synthesis and characterization of diketopyrrolopyrrole-based conjugated polymer with biphenyl for organic photovoltaic cells

Landep Ayuningtias, Jae Yeol Ma, Yu-Jin Kim, Yun-Hi Kim

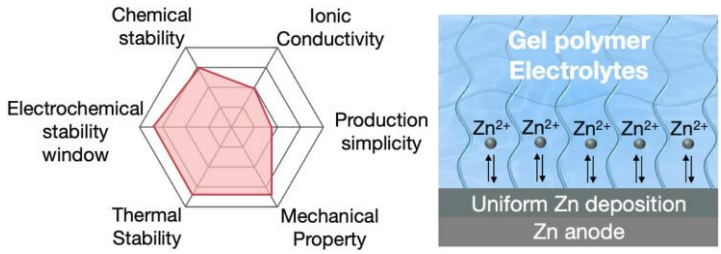


The copolymer of PDPPPhenyl exhibited a broad absorption range from 400 to 900 nm in the visible region and NIR region, a relatively deep HOMO level of −5.29 eV. The 1:4 blend PDPPPhenyl:$PC_{71}BM$ resulted in PCE of 3.8% with a Voc of 0.61 V, Jsc of 9.9 mA/cm^2, and a FF of 63.2%. with PCE of 3.8%, with a Voc of 0.61 V, Jsc of 9.9 mA/cm^2, and a FF of 63.2%.

Bull. Korean Chem. Soc. **2025**, *46*, 754-760. https://doi.org/10.1002/bkcs.70042

R Tough hydrogel designs for stable aqueous zinc ion batteries

Saehyun Kim, Youn Soo Kim

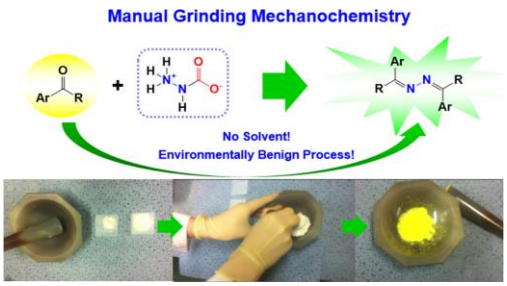


This review highlights recent advances in the structural design of tough hydrogels for gel polymer electrolytes (GPEs) in aqueous zinc-ion batteries (AZIBs). By exploring innovative hydrogel architectures, it provides insights into strategies to enhance ionic conductivity, mechanical strength, and electrochemical stability.

Bull. Korean Chem. Soc. **2025**, *46*, 691-703. https://doi.org/10.1002/bkcs.70040

P Manual grinding mechanochemistry: An emerging tool for environmentally benign and sustainable synthesis

Hee Sun Park, Nam Hwi Hur

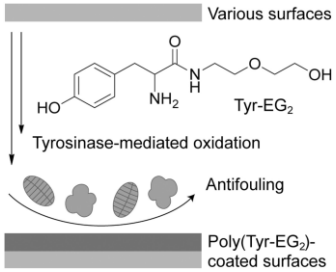


Mechanochemistry is an emerging field that uses mechanical forces to drive chemical reactions. Traditionally, it relies on ball milling, which limits reaction control. We introduce manual grinding mechanochemistry, utilizing highly reactive precursors for improved efficiency. This method enables greener, atom-economy reactions previously unattainable with conventional methods.

Bull. Korean Chem. Soc. **2025**, *46*, 764-777. https://doi.org/10.1002/bkcs.70045

A Tyrosine-conjugated diethylene glycol (Tyr-EG_2) as a small-molecule material for universal antifouling surface coatings

Yubin Hong, Suho Park, Jinwoo Lee, Daeun Chu, Daewha Hong

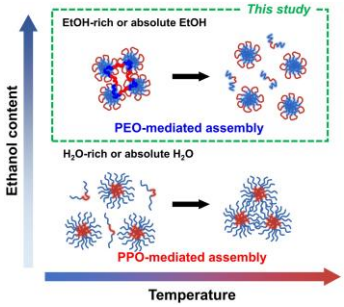


Antifouling surface coatings were feasibly achieved by synthesizing a tyrosine-conjugated diethylene glycol (Tyr-EG_2). In the presence of tyrosinase, Tyr-EG_2 undergoes oxidation under mild aqueous conditions, forming poly(Tyr-EG_2) films on various surfaces.

Bull. Korean Chem. Soc. **2025**, *46*, 907-913. https://doi.org/10.1002/bkcs.70062

A Reversed amphiphilic assembly mechanisms of Pluronic® F127 in high-ethanol content

Woongrak Choi, Eunu Kim, Helen H. Ju, Haeshin Lee

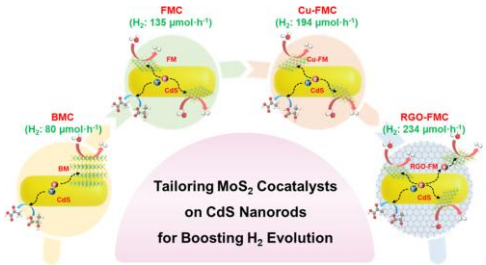


Temperature-dependent reversed amphiphilic self-assembly of F127 in ethanol-rich condition was investigated.

Bull. Korean Chem. Soc. **2025**, *46*, 1093-1101. https://doi.org/10.1002/bkcs.70067

A Significance of transition metal dichalcogenides and their role in the activity of semiconductor materials for spectacular photocatalytic hydrogen production

Khai H. Do, Uyen T. T. Doan, D. Amaranatha Reddy, D. Praveen Kumar, Tae Kyu Kim

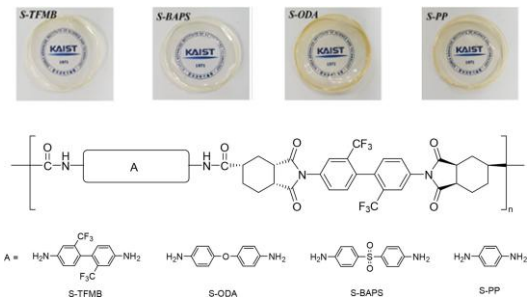


Stepwise modification of MoS_2 on CdS by thinning, Cu doping, and RGO integration progressively improves charge transport and H_2 generation. This strategy demonstrates how rational cocatalyst design drives efficient solar-to-hydrogen conversion.

Bull. Korean Chem. Soc. **2025**, *46*, 1102-1109. https://doi.org/10.1002/bkcs.70082

A Transparent poly(amide-imide)s containing alicyclic and tri-fluoromethyl groups

Seong Jong Kim, Taejoon Byun, Byungyong Lee, Jun Sung Kim, Haeshin Lee, Sang Youl Kim

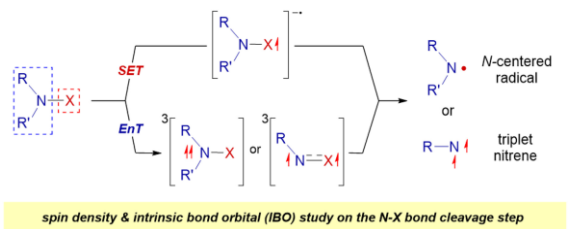


Amorphous PAIs made from the alicyclic diacid monomer containing a rigid biphenylene unit with CF_3 pendent groups show good thermal properties. All the prepared films are transparent. The alicyclic units, along with trifluoromethyl groups positioned between imide and amide bonds in the polymer chains, play a key role in enhancing the optical properties of aromatic polymers.

Bull. Korean Chem. Soc. **2025**, *46*, 1110-1117. https://doi.org/10.1002/bkcs.70084

C Mechanistic evaluations of photocatalytic access to N-centered radicals and nitrenoids

Hoimin Jung, Jeonguk Kweon, Sukbok Chang



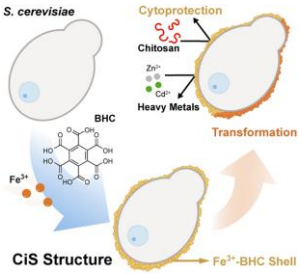
Recently, the photocatalytic formation of reactive N-centered radicals or nitrenes from prefunctionalized amine precursors via single-electron transfer (SET) or triplet–triplet energy transfer (TTEnT) has been significantly developed. However, the detailed electron flow during N–X bond cleavage leading to these intermediates remains unclear. Herein, we employed computational intrinsic bond orbital (IBO) analysis to provide key mechanistic insights into the formation of N-centered reactive intermediates.

Bull. Korean Chem. Soc. **2025**, *46*, 1079-1087. https://doi.org/10.1002/bkcs.70039

C

Single-cell nanoencapsulation of *Saccharomyces* cerevisiae with metal–organic complex nanoshells of Fe^{3+} and benzenehexacarboxylic acid

Sang Yeong Han, Yoonho Jeong, Hojae Lee, Insung S. Choi



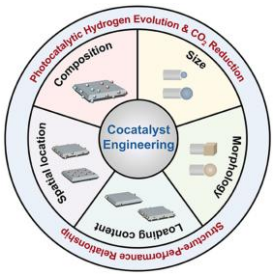
The cell-in-shell (**CiS**) structures are synthesized for *Saccharomyces cerevisiae*, with the metal–organic complex of Fe^{3+} and benzenehexacarboxylic acid (Fe^{3+}-BHC MOC), the nanoshell of which has a unique characteristic of controllable compositional-transformation to Fe^{3+}-phosphate in addition to cytocompatibility, cytoprotectability, and degradability.

Bull. Korean Chem. Soc. **2025**, *46*, 1088-1092. https://doi.org/10.1002/bkcs.70044

R

Cocatalyst is matter: Cocatalyst engineering of photocatalysts on hydrogen evolution and carbon dioxide reduction

Kodong Bang, Jong-Yeong Jung, Yunkyoung Han, Hyunjoon Song



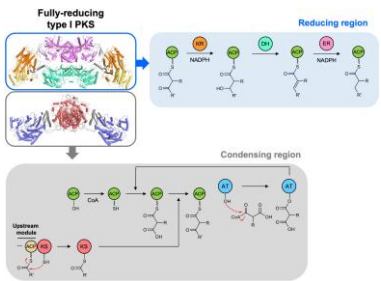
This review highlights the critical roles of metal cocatalyst engineering in enhancing photocatalytic reactions. By systematically focusing on key parameters, including composition, size, morphology, loading content, and spatial location, we provide how cocatalyst design dictates the efficiency of hydrogen evolution and CO_2 reduction, offering insights into advancement for next-generation photocatalysts.

Bull. Korean Chem. Soc. **2025**, *46*, 1028-1047. https://doi.org/10.1002/bkcs.70076

R

Structural insights into modular polyketide synthases: From individual domains to supramolecular assemblies

Minjae Kim, Hyeongwoo Kim, Jin Young Kang



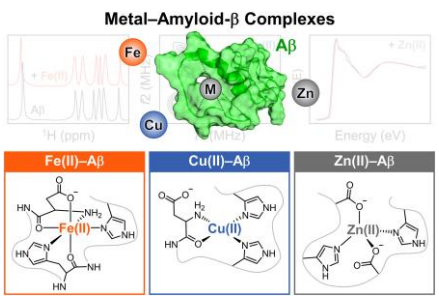
Recent structural advances have enabled modeling of polyketide synthases reaction cycles and revealed key determinants of directionality and specificity in modular PKSs. This review introduces structural features of PKS domains and their organization within the PKS modules.

Bull. Korean Chem. Soc. **2025**, *46*, 1048-1065 https://doi.org/10.1002/bkcs.70081

R

Spectroscopic investigations on metal coordination to amyloid-β

Mingeun Kim, Mi Hee Lim



This review summarizes the coordination chemistry of Fe(II/III), Cu(I/II), and Zn(II) with amyloid-β (Aβ) peptides, as elucidated by nuclear magnetic resonance, electron paramagnetic resonance, and x-ray absorption spectroscopies. By defining the metal-binding sites and coordination geometries, it highlights the atomic- and molecular-level structural properties of metal–Aβ complexes.

Bull. Korean Chem. Soc. **2025**, *46*, 1066-1078. https://doi.org/10.1002/bkcs.70085

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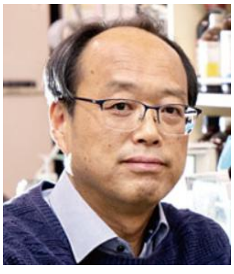

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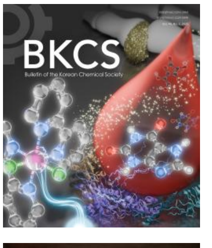
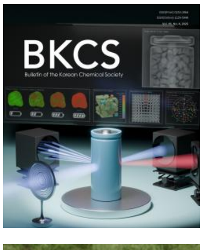
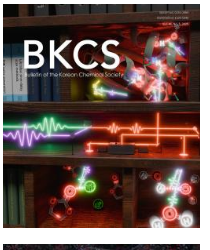
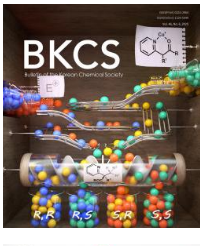
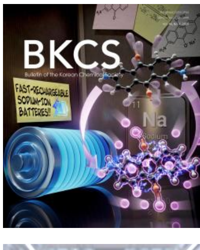
Editor-in-Chief, BKCS

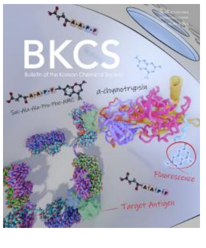


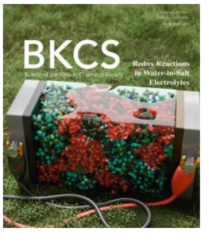


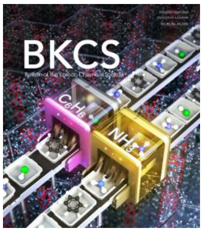












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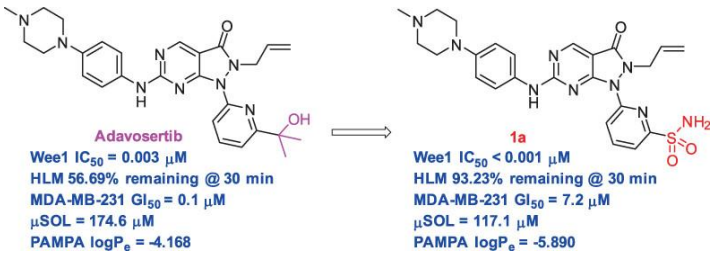
A

Synthesis and biological evaluation of (2-aminosulfonylpyridin-6-yl)pyrazolopyrimidinone derivatives as Wee1 inhibitors for cancer treatment

Yeon Ju Kim, Myoung Eun Jung, Ju Yeong Lee, Yun-Han Lee, Gildon Choi, Moon-Kook Jeon



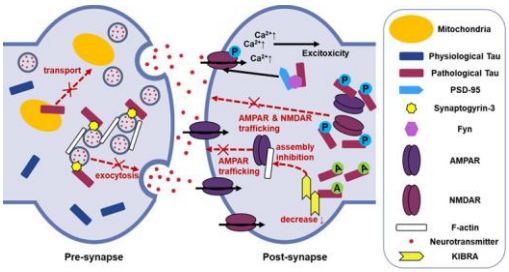
A novel target compound **1a**, with an aminosulfonyl group instead of the 2-hydroxypropan-2-yl moiety in adavosertib was synthesized and showed improved Wee1 enzyme inhibitory activity and metabolic stability. However, it exhibited inferior cellular activities in MDA-MB-231 cell growth inhibition and Wee1 substrate phosphorylation inhibition compared to adavosertib, which may be attributed to its low permeability.

Bull. Korean Chem. Soc. **2024**, *45*, 60-66. https://doi.org/10.1002/bkcs.12791

R

Insights to develop tau-directed therapeutics to protect the synaptic integrity for tauopathies

Eunji Cha, Hak Joong Kim, Sang Min Lim

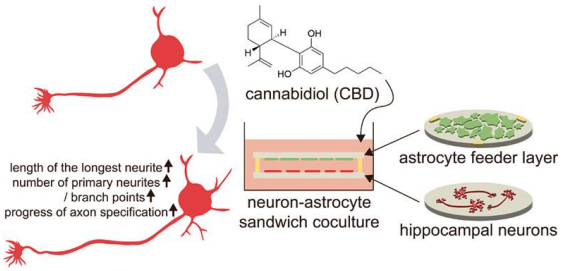


Bull. Korean Chem. Soc. **2024**, *45*, 45-54. https://doi.org/10.1002/bkcs.12792

C

Promoting effects of cannabidiol on neurite growth and neuronal development in neuron-astrocyte sandwich coculture

Jungnam Kim, Hyunwoo Choi, Seoin Yang, Insung S. Choi



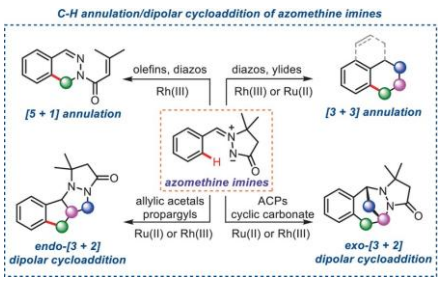
Cannabidiol promotes the early development of primary hippocampal neurons in a neuron-astrocyte sandwich coculture system, such as increases in the longest-neurite length, the number of primary neurites, and the number of branch points.

Bull. Korean Chem. Soc. **2024**, *45*, 55-59. https://doi.org/10.1002/bkcs.12795

R

Tandem annulation and dipolar cycloaddition of azomethine imines in catalytic C(sp^2)–H functionalization

Neeraj Kumar Mishra, Amitava Rakshit, Kyeongwon Moon, Pargat Singh, In Su Kim



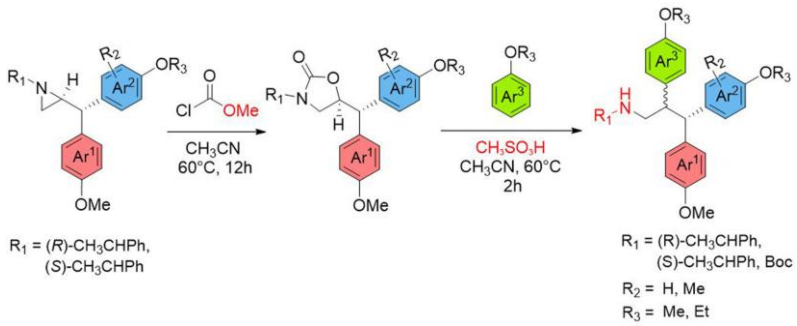
In this review, we have summarized recent progress on the catalytic C–H functionalization and intramolecular cyclization of azomethine imines with a range of coupling partners, such as olefins, alkynes, diazo compounds, ylides, allylic acetals, propargyl compounds, ACPs, and cyclic carbonates. Two representative strategies, annulative cyclization and dipolar cycloaddition, were illustrated.

Bull. Korean Chem. Soc. **2024**, *45*, 131-144. https://doi.org/10.1002/bkcs.12809

C

Synthesis of diverse aryl-substituted amino propanes

Seyeon Yoo, Sojeong Yi, Hyun-Joon Ha

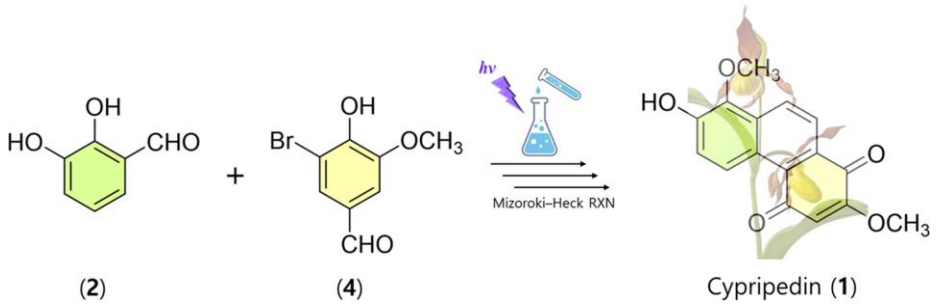


Bull. Korean Chem. Soc. **2024**, *45*, 247-251. https://doi.org/10.1002/bkcs.12820

C

Total synthesis of cypripedin

Hyun Jung Kim, Bok Yun Kang, Jung-Hyun Shim, Seung-Sik Cho, Eunae Kim, Goo Yoon

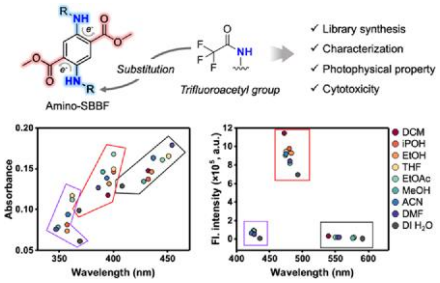


Bull. Korean Chem. Soc. **2024**, *45*, 359-361. https://doi.org/10.1002/bkcs.12832

C

Trifluoroacetyl-effect on amino-single benzene-based fluorophores: Synthesis, optical properties, and cytotoxicity

Ji Hye Jin, Dopil Kim, Jisoo Kang, Sangho Lee, Jong Min An, Min Kim, Dokyoung Kim



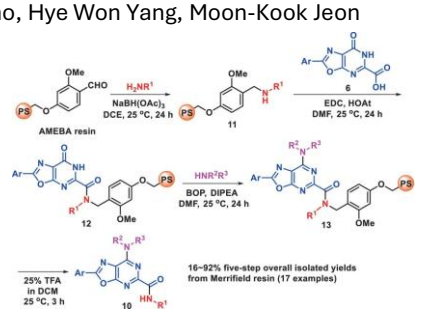
We disclosed a new library based on amino-single benzene-based fluorophore (SBBF) with substituting trifluoroacetyl moiety. The synthesis, optical properties in various organic/aqueous solvents, and evaluated cell viability were systematically conducted.

Bull. Korean Chem. Soc. **2024**, *45*, 451-455. https://doi.org/10.1002/bkcs.12836

A

Solid-phase synthetic method for *N*-alkyl-7-alkylamino-2-aryloxazolo[5,4-*d*]pyrimidine-5-carboxamide derivatives

Min Ju Cho, Hye Won Yang, Moon-Kook Jeon



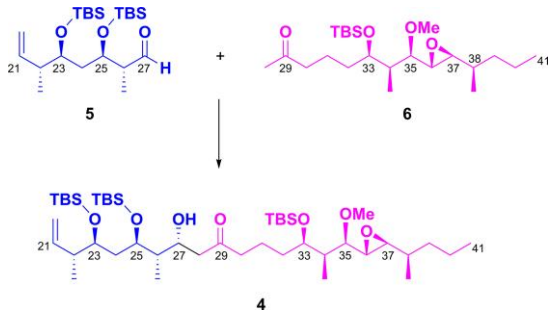
Loading of template compounds **6** onto aminated AMEBA resins **11**, a subset of BOP-mediated direct amination reactions, and final cleavage from the solid support afforded 17 target compounds **10** in 16%–92% five-step overall isolated yields from Merrifield resin.

Bull. Korean Chem. Soc. **2024**, *45*, 460-471. https://doi.org/10.1002/bkcs.12834

C

Synthesis of C_{21}-C_{41} fragment of the reported structure of Neaumycin B

Eun Gyeong Choi, Eun Bi Kim, Duck Hyung Lee



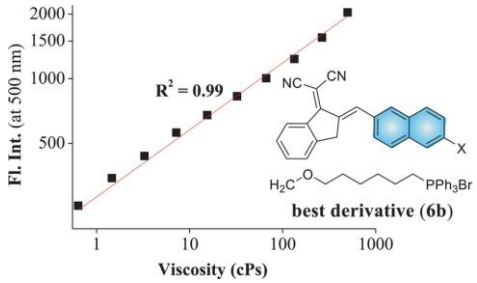
Stereoselective synthesis of the C_{21}-C_{41} fragment **4**.

Bull. Korean Chem. Soc. **2024**, *45*, 362-365. https://doi.org/10.1002/bkcs.12825

C

Systematic derivatives of 1-(dicyanomethylene)indan and their photophysical properties as potential viscosity sensors

Tae-Ho Roh, Min-Sung Ko, Pradeep P. Desale, Dong-Gyu Cho



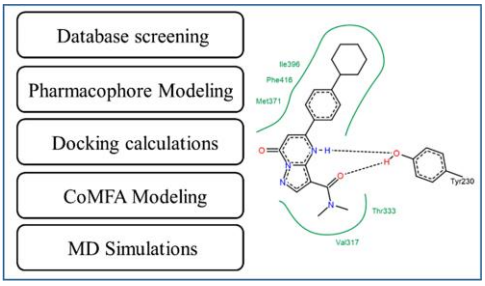
This research demonstrates creating a viscosity sensor from 1-(dicyanomethylene)indan as a new skeleton. Salt-capped derivatives show notable linearity (R^2 = 0.99) between fluorescence intensity and viscosity, with reversible changes at two temperatures, a crucial trait.

Bull. Korean Chem. Soc. **2024**, *45*, 456-459. https://doi.org/10.1002/bkcs.12838

A

Computational basis of TEAD-3 protein noncovalent inhibition: 3D-QSAR modeling and molecular dynamics simulation

Bita Kaviani, Marzieh Ghani Dehkordi, Hamed Haghshenas

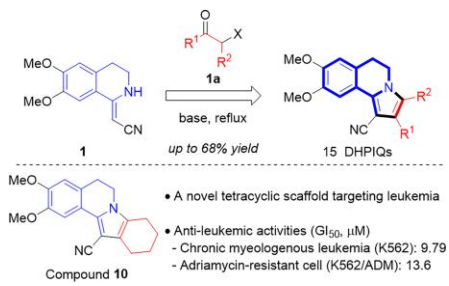


Bull. Korean Chem. Soc. **2024**, *45*, 535-550. https://doi.org/10.1002/bkcs.12843

A

A single-step synthesis of 5,6-dihydropyrrolo[2,1-*a*]isoquinolines and evaluation of their anti-leukemic activity

Hoyeong Park, Santosh Shivanand Raikar, Min Jeong Ahn, Seong Hwan Kim, Pilho Kim



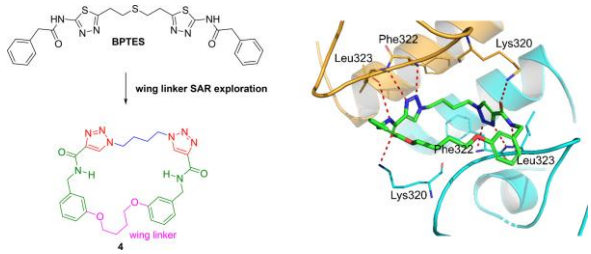
Pharmaceutically intriguing 5,6-dihydro-pyrrolo[2,1-*a*]isoquinolines (DHPIQs) were prepared by a single-step metal-free method from cyanomethylene-THIQ (**1**) and α-halo-ketones or aldehydes (**1a**) in moderate yields, and their preliminary biological activities were evaluated against leukemic K562 and adriamycin-resistant K562/ADM, resulting in compound **10** active in the both cell lines.

Bull. Korean Chem. Soc. **2024**, *45*, 551-559. https://doi.org/10.1002/bkcs.12846

A

Novel allosteric glutaminase inhibitors with macrocyclic structure activity relationship analysis (part 2)

Eun Ji Lee, Jiyoon Jang, Rajath Cyriac, Mi Ran Yun, Yeongju Kwon, Myoung Eun Jung, Gildon Choi, Chong Hak Chae, Byoung Chul Cho, Kwangho Lee



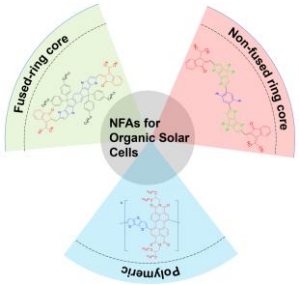
Medicinal chemistry strategy and binding pose of novel macrocyclic glutaminase inhibitor 4 in the allosteric site of glutaminase.

Bull. Korean Chem. Soc. **2024**, *45*, 639-644. https://doi.org/10.1002/bkcs.12883

R

Advancements in non-fullerene acceptors for organic solar cells: Brief review of research trends

Minsoo Lee, Eunhye Hwang, Taehyo Kim, Tae-Hyuk Kwon



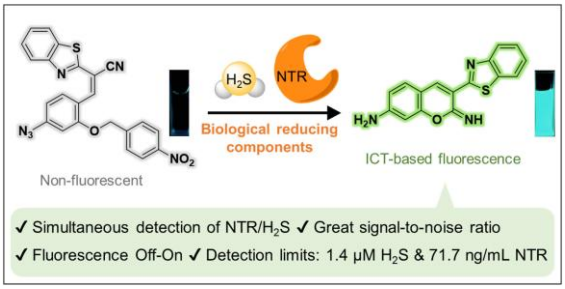
Non-fullerene acceptors (NFAs) have spurred rapid advancements in organic solar cells (OSCs) due to their strong light absorption, tunable energy levels, and improved charge transport, effectively overcoming the limitations of OSCs using fullerene-based acceptors. This review covers the latest research trends, prospects, and challenges for high-performance NFA-based OSCs toward commercialization.

Bull. Korean Chem. Soc. **2024**, *45*, 664-674. https://doi.org/10.1002/bkcs.12888

C

Off–On fluorescent benzothiazole-fused coumarin for sensitive detection of nitroreductases and hydrogen sulfide

Song Yi Yoo, Na Yoon Kim, Min Hee Lee



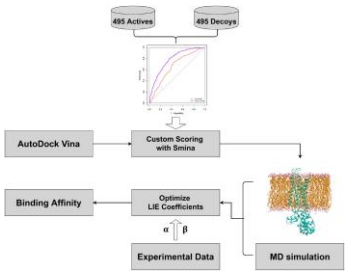
Hydrogen sulfide (H_2S) and nitroreductases (NTR) are crucial biological reductants often overexpressed in cancer cells or bacterial environments. We designed dual detection probe, which transforms into benzothiazole-fused coumarin and exhibits high fluorescence only when both NTR and H_2S are overexpressed, offering a potential tool for simultaneous detection.

Bull. Korean Chem. Soc. **2024**, *45*, 699-705. https://doi.org/10.1002/bkcs.12889

A

A time-efficient computational binding affinity estimation protocol with utilization of limited experimental data: A case study for adenosine receptor

Ilkwon Cho, Sunghyun Moon, Kwang-Hwi Cho

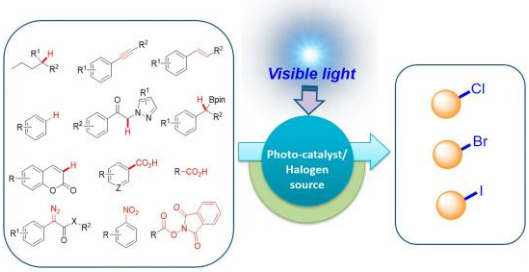


A new binding affinity estimation protocol that utilizes molecular docking with limited experimental data and estimates binding affinity using molecular dynamics simulation has been proposed. A custom scoring function was employed during docking to identify an improved initial binding pose, and the linear interaction energy method with an optimized coefficient was used for binding affinity estimation.

Bull. Korean Chem. Soc. **2024**, *45*, 778-787. https://doi.org/10.1002/bkcs.12890

R Recent progress in visible light-driven halogenation: Chlorination, bromination, and iodination

Anh Thu Nguyen, Houng Kang, Truong Giang Luu, Sung-Eun Suh, Hee-Kwon Kim

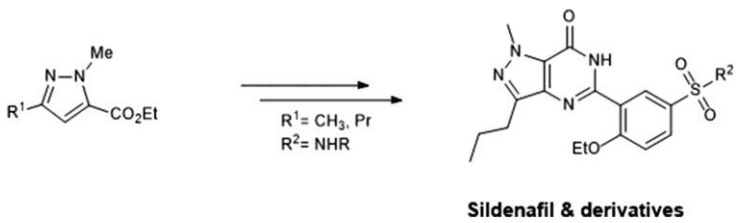


Halogenations have been widely used in chemistry due to a lot of application. This review focus on recent development of visible light-mediated halogenation process including chlorination, bromination, and iodination.

Bull. Korean Chem. Soc. **2024**, *45*, 738-758. https://doi.org/10.1002/bkcs.12896

C Synthesis of sildenafil and its derivatives bearing pyrazolo-pyrimidinones scaffold

Seung Su Lee, Chang Ho Oh

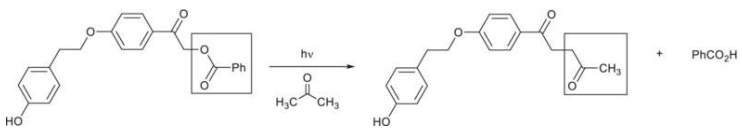


We report the synthesis of pyrazolo-pyrimidiones as sildenafil and its derivatives. Four types of compounds were synthesized with a simplified and efficient synthetic route. The use of readily available starting materials highlights the practicality of this method. In addition, this approach facilitates further exploration and applications in medicinal chemistry and drug development.

Bull. Korean Chem. Soc. **2024**, *45*, 759-763. https://doi.org/10.1002/bkcs.12893

C Photochemical coupling reaction of phenacyl benzoate with acetone to form 1,4-dicarbonyl compound enabled by charge transfer

Ho Suk Shin, Bong Ser Park

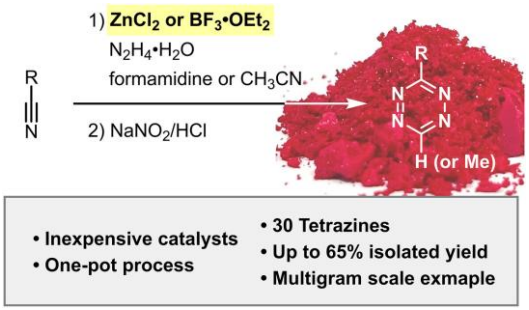


An unprecedented photoinduced coupling reaction to give a 1,4-dicarbonyl compound is observed in the photolysis of phenacyl benzoates in acetone.

Bull. Korean Chem. Soc. **2024**, *45*, 863-866. https://doi.org/10.1002/bkcs.12898

A Cost-effective synthesis of unsymmetric tetrazines

Jiwon Hwang, Byeongjip Yoon, Sung-Eun Suh

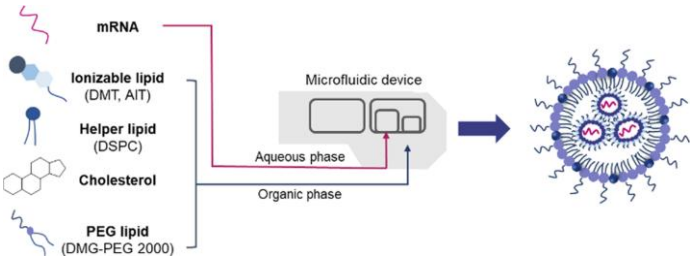


1,2,4,5-Tetrazines, key for synthesizing (hetero)aromatics, enable bioorthogonal ligation without biological interference. Existing synthesis methods are costly and hazardous. This study introduces safer, cheaper alternatives using zinc chloride or boron trifluoride diethyl etherate, enhancing safety, and reducing costs.

Bull. Korean Chem. Soc. **2024**, *45*, 867-872. https://doi.org/10.1002/bkcs.12903

A Study of functional lipid nanoparticles for mRNA delivery using new ionizable tocopherol derivatives

Minyoung Choi, Onesun Jung, Eunjung Lee, Joon Sig Choi

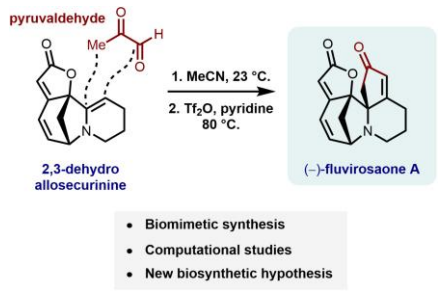


In this study, tocopherol-derived ionizable lipids were synthesized to produce functional lipid nanoparticles for mRNA delivery. Lipid nanoparticles using newly developed ionizable tocopherol derivatives have potential as biocompatible and effective mRNA delivery vehicles.

Bull. Korean Chem. Soc. **2024**, *45*, 929-936. https://doi.org/10.1002/bkcs.12909

C Biomimetic synthesis of fluvirosaone A

Gyumin Kang, Sunkyu Han

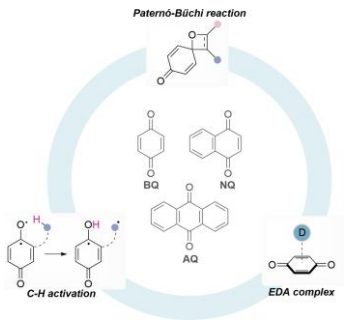


This communication presents the biomimetic synthesis of fluvirosaone A, a pentacyclic high-oxidation state securinega alkaloid. Drawing from both experimental and computational studies, we propose a new biosynthetic pathway for fluvirosaone A, identifying pyruvaldehyde as the source of the three additional carbons integrated into the securinega framework.

Bull. Korean Chem. Soc. **2024**, *45*, 876-879. https://doi.org/10.1002/bkcs.12907

R Visible light induced reactions of quinones

Jihoon Jang, Gayeon Lee, Eun Jin Cho

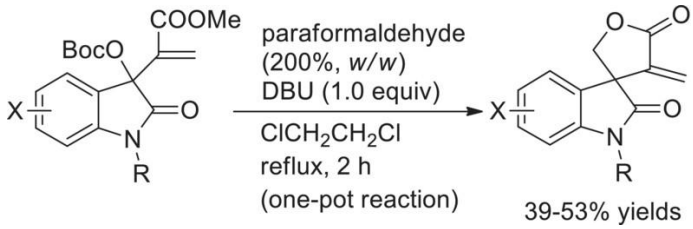


This review covers the visible light induced reactions of quinones, focusing on three key types: Paternò–Büchi reactions, CH activation processes, and the formation of electron donor–acceptor complexes.

Bull. Korean Chem. Soc. **2024**, *45*, 966-976. https://doi.org/10.1002/bkcs.12913

A One-pot synthesis of spirooxindoles bearing α-methylene-γ-butyrolactone moiety from Morita–Baylis–Hillman carbonates of isatins and paraformaldehyde

Junseong Lee, Jae Nyoung Kim



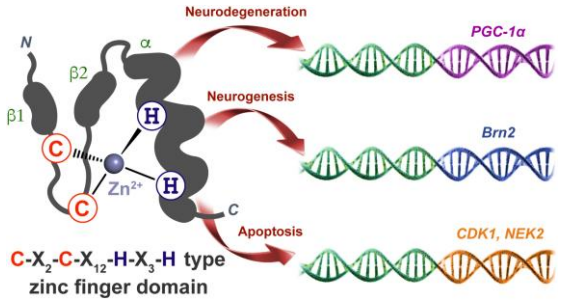
Spirooxindole **3a**, bearing α-methylene-γ-butyrolactone moiety, has been synthesized in a one-pot reaction from the Boc carbonate of Morita–Baylis–Hillman adduct of *N*-methylisatin and paraformaldehyde in the presence of 1,8-diazabicyclo[5.4.0]undec-7-ene in refluxing 1,2-dichloroethane in moderate yield (52%).

Bull. Korean Chem. Soc. **2024**, *45*, 1015-1020. https://doi.org/10.1002/bkcs.12915

R

Regulation of classical zinc fingers for neuronal signaling in the central nervous system

Yunha Hwang, Soyeon Park, Hyunyong Kim, Yerim Park, Hyun Goo Kang, Dong-Heon Lee, Seung Jae Lee



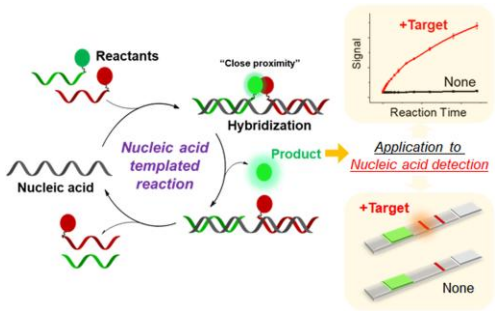
The classical C-X_2-C-X_{12}-H-X_3-H type zinc finger domains, detected in the brain, are associated with neurodegenerative disease, long- and short-term memory, neuronal differentiation and development, and other physiological processes.

Bull. Korean Chem. Soc. **2024**, *45*, 977-986. https://doi.org/10.1002/bkcs.12920

R

Nucleic acid-templated chemical reactions for nucleic acid detection

Ji Young Ryu, Ha Yeong Park, Hayeong Shin, Ki Tae Kim



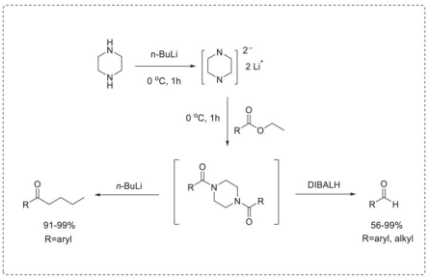
This review introduces recent advances in the design and application of nucleic acid-templated reactions for nucleic acid detection. Owing to their advantageous features, such as signal amplification, isothermal nonenzymatic operation, and diverse reaction designs, templated reactions hold considerable potential toward the development of next-generation nucleic acid sensors with high sensitivity, selectivity, rapidity, and user-friendliness.

Bull. Korean Chem. Soc. **2025**, *46*, 24-34. https://doi.org/10.1002/bkcs.12924

A

Direct conversion of esters to aldehydes and ketones via piperazine amide under mild conditions

Jae Seok Kwak, Ashok Kumar Jaladi, Duk Keun An



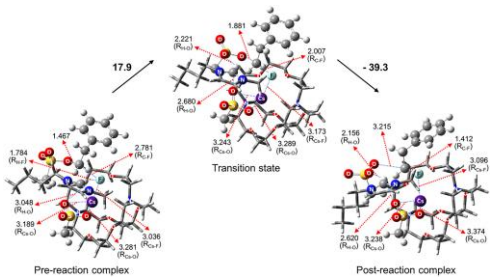
The method developed for synthesizing aldehydes and ketones directly from carboxylic esters via the piperazine amide intermediate under mild conditions. The in situ generated aminolysis intermediate, piperazine-1,4-diylbis(phenylmethanone) amide, is readily reacted with DIBALH and *n*-BuLi obtaining carbonyls in a one-pot reaction. Gram-scale synthesis of aldehyde and ketone was reported in good yields.

Bull. Korean Chem. Soc. **2025**, *46*, 152-155. https://doi.org/10.1002/bkcs.12937

A

Lewis base phase transfer catalyst promoted solvent-free nucleophilic reactions in ionic liquids: Quantum chemical analysis for cooperative enhancement in S_N2 reaction rates

Young-Ho Oh, Sungyul Lee



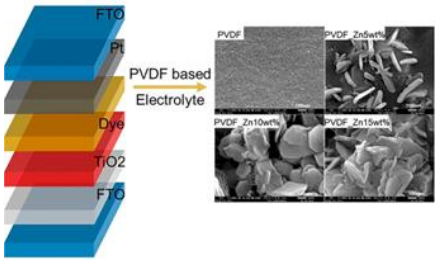
Two Lewis base phase transfer catalysts (crown ether and ionic liquid) cooperate to enhance the rates of S_N2 reactions. The ionic liquid anion OMs^- acts as an auxiliary Lewis base on the counter-cation M^+ (M = K, Cs), thereby further mitigates the latter's disadvantageous influence on the nucleophile.

Bull. Korean Chem. Soc. **2025**, *46*, 178-185. https://doi.org/10.1002/bkcs.12940

A

Preparation and properties of $Zn_5(OH)_8Cl_2$ as an inorganic filler in poly(vinylidene fluoride) based electrolytes for dye-sensitized solar cells

Mi-Ra Kim, Sung Soo Park, Wontae Oh, Seongman Lee, Gahyun Kim, Minseok Yoo, Hu Ying, Pilgun Oh, Songyi Lee



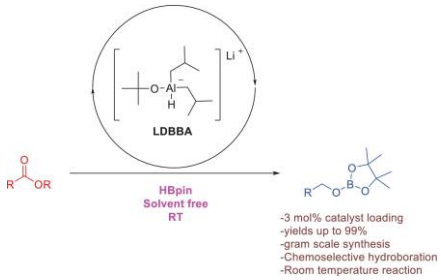
In this study, we demonstrate the development of $Zn_5(OH)_8Cl_2$ as an inorganic filler to enhance poly(vinylidene fluoride)-based electrolytes for dye-sensitized solar cells. Incorporating 15 wt% $Zn_5(OH)_8Cl_2$ significantly improved ionic conductivity and achieved a high energy conversion efficiency of 7.52%, advancing DSSC performance

Bull. Korean Chem. Soc. **2025**, *46*, 211-220. https://doi.org/10.1002/bkcs.70006

A

Lithium diisobutyl-*tert*-butoxyaluminum hydride promoted ester hydroboration: An efficient protocol under solvent-free conditions at room temperature

Hwan Hwi Kim, Hyun Ji Han, Ashok Kumar Jaladi, Duk Keun An



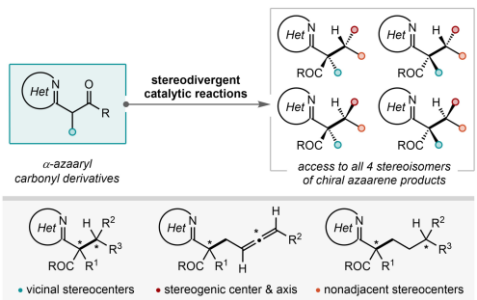
An aluminum-based catalyst (LDBBA) promoted ester hydroboration with pinacolborane (HBpin) under solvent-free conditions is reported. The LDBBA was found to be superior among the tested aluminum hydride catalysts; various esters were converted to corresponding boronates in good-to-excellent yields at room temperature. Gram-scale, chemoselective hydroborations of esters are also reported.

Bull. Korean Chem. Soc. **2025**, *46*, 516-519. https://doi.org/10.1002/bkcs.70017

R

α-Azaaryl carbonyl derivatives in stereodivergent catalytic reactions

Ilwoo Song, Byungjun Kim, Hooseung Lee, Sarah Yunmi Lee



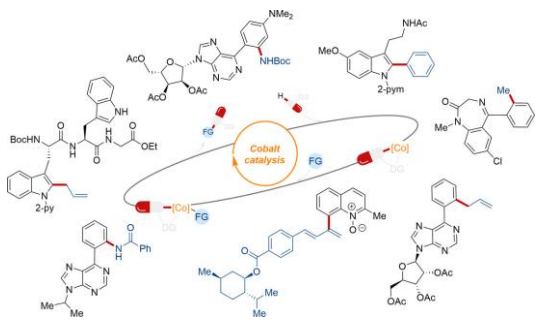
This review highlights recent progress in the catalytic synthesis of chiral azaarenes, focusing on α-azaaryl carbonyl derivatives as versatile precursors. By leveraging chiral Lewis acid catalysis, stereodivergent reactions with diverse electrophiles enable precise construction of multi-stereogenic azaarenes, offering new opportunities for advanced synthesis in medicinal chemistry and materials science.

Bull. Korean Chem. Soc. **2025**, *46*, 602-621. https://doi.org/10.1002/bkcs.70029

R

Cp*Co(III)-catalyzed C–H functionalization of bioactive heterocyclic motifs

Yeongmi Park, Junbeom Park, Yong Ho Lee, Jongwoo Son



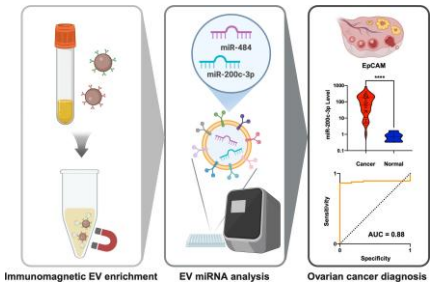
Directed carbon–hydrogen bond functionalization of biologically active scaffolds is attractive as it enables the selective modification of sophisticated structures, enhancing the efficiency of drug development by adopting diverse functional groups. This review summarizes recent advances in cobalt-catalyzed C–H functionalizations of bioactive motifs including late-stage.

Bull. Korean Chem. Soc. **2025**, *46*, 622-635. https://doi.org/10.1002/bkcs.70031

A

EpCAM and CD24 specific EVRNA analysis for ovarian cancer diagnosis

Yejin Kim, Da Han Hyun, Yoon Hee Lee, Woojeong Lim, Hoyeon Lee, Soyeon Lee, Hyeon-Ki Jang, Joohyun Lim, Dae Gy Hong, Jun Seok Park, Soo Yeun Park, Jongmin Park



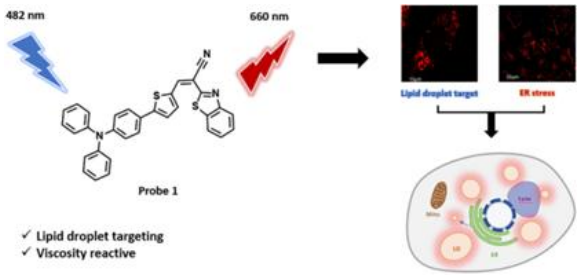
We developed a sensitive EV analysis technique by combination of immunomagnetic enrichment of tumor-derived EVs with miRNA analysis. This technique offers over 88% diagnostic accuracy of ovarian cancer using only a single miRNA marker analysis of plasma EVs.

Bull. Korean Chem. Soc. **2025**, *46*, 673-679. https://doi.org/10.1002/bkcs.70041

A

A lipid droplet-selective fluorescent probe for real-time imaging and polarity sensing

Yerim Lee, Bokyeong Hwang, Bingqing Sun, Hai Xu, Lei Liu, Juyoung Yoon



In this study, we present a fluorescent probe **1** with lipid droplets-targeting and solvent-dependent emission properties. Its photophysical behavior and selectivity were analyzed using density functional theory (DFT), time-dependent DFT, and confocal laser scanning microscopy.

Bull. Korean Chem. Soc. **2025**, *46*, 859-866. https://doi.org/10.1002/bkcs.70061

R

Waste plastic upcycling via homogeneous catalytic hydrogenation/dehydrogenation/transfer hydrogenation

Mi-hyun Lee, Hye-Young Jang

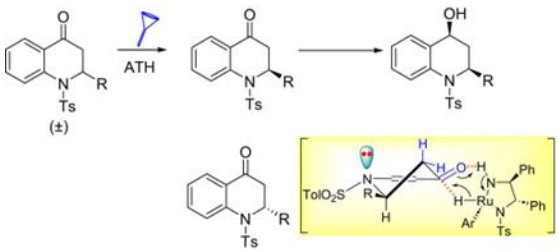
The environmental and economic benefits of transforming waste plastics into valuable chemicals have spurred extensive studies in chemical recycling and upcycling. This review explores recent advancements in the chemical upcycling of polyesters, polycarbonates, polyamides, and polyethylene through transition-metal-catalyzed hydrogenation, dehydrogenation, and transfer hydrogenation processes.

Bull. Korean Chem. Soc. **2025**, *46*, 968-977. https://doi.org/10.1002/bkcs.70069

C

Kinetic resolution of dihydroquinolines via Ru(II)-TsDPEN-catalyzed asymmetric transfer hydrogenation

Suh Young Yu, Jihye Lee, Aimin Zhang, Jimin Kim



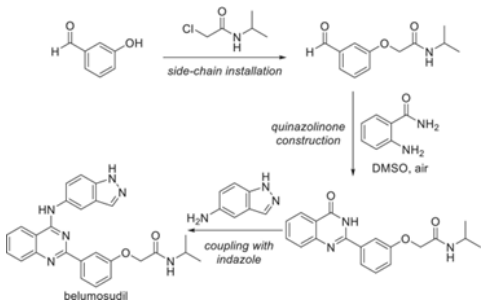
Ru(II)-TsDPEN-catalyzed ATH resolves 2-substituted azaflavones under HCO_2Na/PTC, delivering *N*-tosyl dihydroquinolinones and tetrahydroquinolin-4-ols in high conversion and up to >99% ee, offering a practical route to diverse *N*-heterocycles.

Bull. Korean Chem. Soc. **2025**, *46*, 1122-1126. https://doi.org/10.1002/bkcs.70073

C

Synthesis of belumosudil

Sangjun Park, Jinjae Park, Tae Lyn Kim, Cheol-Hong Cheon



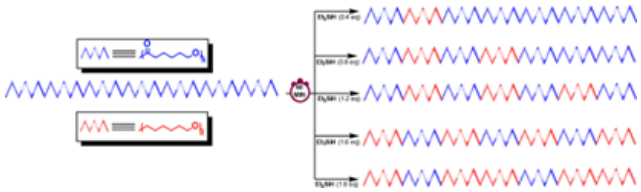
The practical synthesis of belumosudil, an FDA-approved drug for chronic graft-versus-host disease (cGVHD), was achieved using a metal-free aerobic oxidative cyclization of anthranilamide and an aldehyde in DMSO as the key step toward quinazolinone formation. This synthetic route is characterized by the avoidance of protecting groups, scalability, and facile purification by recrystallization.

Bull. Korean Chem. Soc. **2025**, *46*, 1127-1131. https://doi.org/10.1002/bkcs.70079

C

Synthesis of polyester–polyether copolymers via postpolymerization modification: Reduction of polyesters

Sana Jamshaid, Jeung Gon Kim



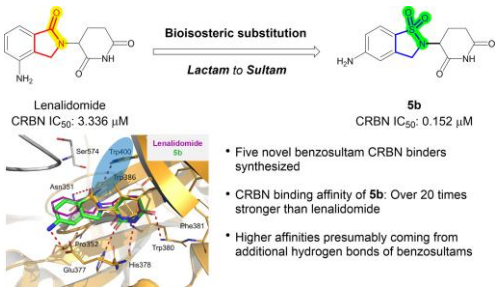
Partial reduction of polyesters affords polyester–polyether copolymers with controlled composition and tunable thermal properties.

Bull. Korean Chem. Soc. **2025**, *46*, 1132-1135. https://doi.org/10.1002/bkcs.70087

A

Discovery of novel benzosultam CRBN ligands

Hoyeong Park, Santosh Shivanand Raikar, Yonghyo Kim, Chong Hak Chae, Yong-Hee Cho, Pilho Kim



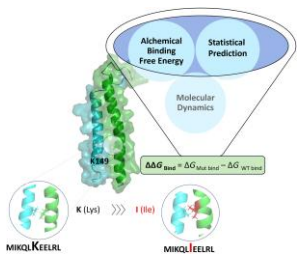
Five novel benzosultam CRBN ligands were synthesized and evaluated their CRBN binding affinities. The 5-amino benzosultam ligand (**5b**) demonstrated a CRBN binding affinity over 20 times stronger than lenalidomide. Molecular docking studies suggest the enhanced binding affinities could be from an additional hydrogen bond of benzosultams with Trp400 of CRBN. These findings highlight the potential of novel benzosultam ligands as a new tool for CRBN-mediated TPD strategies.

Bull. Korean Chem. Soc. **2025**, *46*, 48-56. https://doi.org/10.1002/bkcs.12921

A

Integrative computational pipeline for identifying binding-enhancing mutations targeting the MBD2–p66α interaction: Implications for therapeutic applications

Sargol Mazraedoost, Hadi Sedigh Malekroodi, Myunggi Yi, J. Jay Liu, Sung In Lim



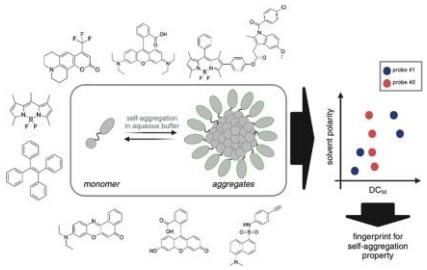
This study introduces a computational pipeline to identify and assess stabilizing mutations in the coiled-coil protein–protein interaction between MBD2 (methyl-CpG-binding domain protein 2) and p66α (transcriptional repressor p66-alpha). Using BeAtMuSiC for initial predictions and rigorous alchemical free energy calculations the research identifies key mutations that enhance or destabilize binding.

Bull. Korean Chem. Soc. **2025**, *46*, 57-68. https://doi.org/10.1002/bkcs.12923

A

Quantitative analysis of disaggregation properties of aggregation-induced emission luminogens (AIEgens) and off-the-shelf dyes

Kyung Tae Hong, Jun-Hyuk Jeon, Soeun Park, Lavanya Gopala, Jane Lee, Jun-Seok Lee



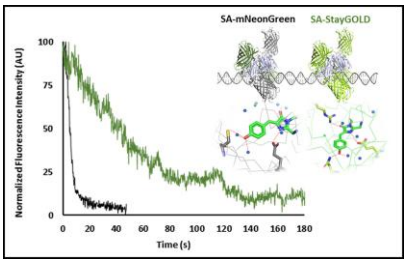
This study investigates the solvent-dependent self-aggregation and disaggregation properties of fluorophores and AIEgens using disaggregation concentration (DC_{50}) as a quantitative metric. Unique DC_{50} patterns reflecting structural characteristics were identified, providing insights into aggregation-dependent photophysics and enabling the rational design of chemosensors.

Bull. Korean Chem. Soc. **2025**, *46*, 116-121 https://doi.org/10.1002/bkcs.12933

A

Fluorescent properties and photostability of streptavidin-conjugated StayGOLD protein for DNA labeling

Yurie Tehee Kim, Joohee Choe, Kyubong Jo



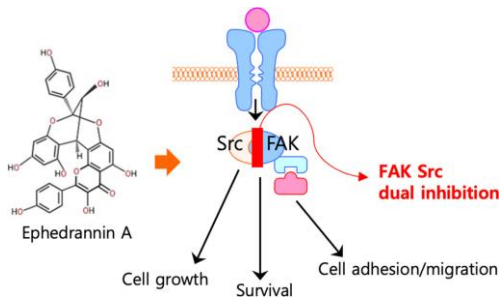
Fluorescent proteins (FPs) have been invaluable for molecular imaging, though the challenge of photobleaching persists, affecting long-term observations. This study examines the spectrum and enhanced photostability of streptavidin-coupled StayGOLD (SA-StayGOLD) as an alternative to SA-mNeonGreen for DNA labeling applications. StayGOLD, derived from *Cytaeis uchida*, demonstrates significantly higher photostability, reportedly ten orders of magnitude above traditional FPs. Using SA-StayGOLD in single-molecule DNA labeling, we observed improved fluorescence intensity with minimized photobleaching compared to SA-mNeonGreen. Spectral analysis indicated that stability differences arise primarily from distinct chromophore interactions; specifically, arginine (R86) near StayGOLD's chromophore appears to stabilize the carboxyl group of its imidazolinone ring, supporting resonance. Validation through gel filtration and bleaching assays underscored photostability as the main contributor to StayGOLD's superior fluorescence intensity. Consequently, SA-StayGOLD presents an advanced tool for molecular imaging and DNA labeling, where photostability and fluorescence are crucial for high-quality data. These findings represent a valuable advancement in FP design, particularly for applications requiring sustained imaging and reduced photobleaching.

Bull. Korean Chem. Soc. **2025**, *46*, 293-300. https://doi.org/10.1002/bkcs.12941

A

Ephedrannin A: A potent dual inhibitor of FAK and Src with anticancer effects

Hien Thi My Ong, Eda Ates, Min-Jung Kang



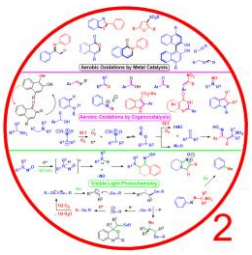
The natural compound ephedrannin A inhibited various cancer cells' growth and proliferation and expression levels of focal adhesion kinase (FAK), p-FAK, Src, and c-Myc. Dual targeting of FAK and src for cancer treatment by ephedrannin A might be promising.

Bull. Korean Chem. Soc. **2025**, *46*, 317-325. https://doi.org/10.1002/bkcs.70002

P

Molecular oxygen-mediated functional group transformations in catalysis and beyond: Genesis of ortho-naphthoquinone catalysts

Rahulkumar Patel, Soocheon Lee, Hun Young Kim, Kyungsoo Oh



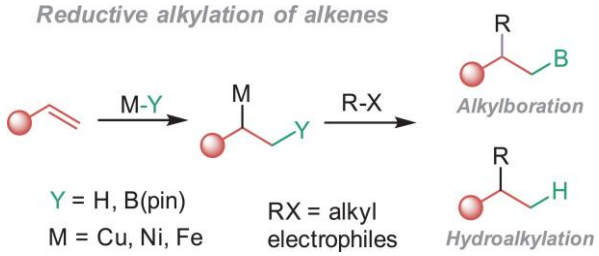
This Personal Account discusses our recent work on metal- and organo-catalyzed aerobic oxidation protocols, highlighting key breakthroughs in amine oxidation, heterocycle synthesis, and the versatile use of *ortho*-naphthoquinone catalysts in dehydrogenation and deamination. Additionally, this Account summarizes the visible light photochemistry of N-nitrosamines and selenofunctionalization using molecular oxygen.

Bull. Korean Chem. Soc. **2025**, *46*, 347-359. https://doi.org/10.1002/bkcs.70008

R

Metal-catalyzed reductive alkylation of alkenes: From copper to alternative catalysts

Deyuan Meng, Jaesook Yun



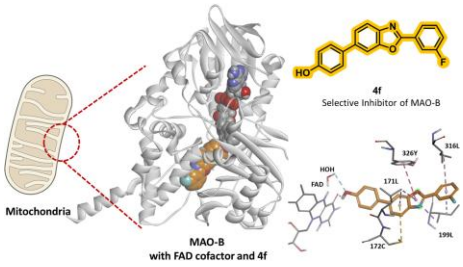
This review highlights advancements in copper-catalyzed reductive alkylation of alkenes, focusing on the use of Cu–H and Cu–B(pin) as catalysts. Additionally, emerging trends, such as copper-catalyzed radical-based transformations and borylative alkylation using alternative first-row transition metals such as nickel and iron, are summarized.

Bull. Korean Chem. Soc. **2025**, *46*, 413-421. https://doi.org/10.1002/bkcs.70016

C

2,6-Diarylbenzo[*d*]oxazoles as MAO-B inhibitors for the treatment of Parkinson's disease

Haeun Lee, Vikram Shahaji Sawant, Uhyeok Kim, Jinhyeok Kim, Soo Yeon Baek, Sanghee Lee, Hyunah Choo, Taek Kang, Byungsun Jeon



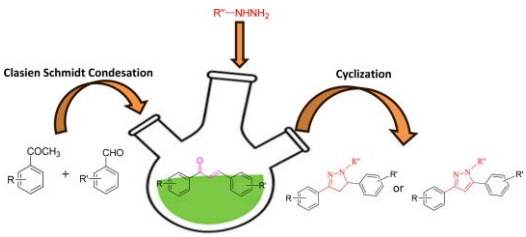
4-(2-(3-Fluorophenyl)benzo[*d*]oxazol-6-yl)phenol, designated as **4f**, was identified as a highly potent and selective inhibitor of human MAO-B (hMAO-B).

Bull. Korean Chem. Soc. **2025**, *46*, 422-428. https://doi.org/10.1002/bkcs.70010

R

Advances in the synthesis and biological functionality of pyrazolines and pyrazoles from chalcone precursors

Priyanka Rani, Sudeep Dhillon, Ginna Kumari, Mamta Chahal, Deepak Kumar Aneja, Bhawna Pareek, Mayank Kinger



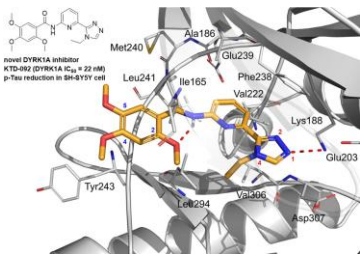
- Synthetic routes employed in the fabrication of Pyrazolines and Pyrazoles
- Recognized for their extensive pharmaceutical potential
- A valuable resource for developing novel and effective therapeutic agents

Bull. Korean Chem. Soc. **2025**, *46*, 481-515. https://doi.org/10.1002/bkcs.70022

A

Discovery of 2-(1,2,4-triazol-3-yl)pyridine KTD-092 as a novel DYRK1A inhibitor

Sujeong Hong, Subin Hwang, Rajath Cyriac, Hyunha Choi, Gahyeon Choi, Eun Hye Kim, Chaemi Lee, Seong Hwan Kim, Sunjoo Ahn, Chong Hak Chae, Jin Sook Song, Kwangho Lee



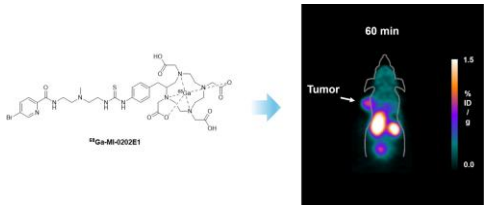
KTD-092 is a novel 2-(1,2,4-triazol-3-yl)pyridine DYRK1A inhibitor for neurodegenerative diseases treatment. KTD-092 reduces tau phosphorylation in a human neuroblastoma cell in a concentration-dependent manner. Structure–activity relationship and molecular modeling of KTD-092 are carefully disclosed.

Bull. Korean Chem. Soc. **2025**, *46*, 520-525. https://doi.org/10.1002/bkcs.70018

A

Radiosynthesis and evaluation of a ^{68}Ga-labeled brominated benzamide derivative for detection of melanoma in small animals

Dagyeong Hong, Chaewon Lee, Boreum Song, Eunsu Kim, Yejin Seo, Jiyu Kim, Wookyeong Jeong, Seong-Young Kwon, Dong-Yeon Kim, Ayoung Pyo



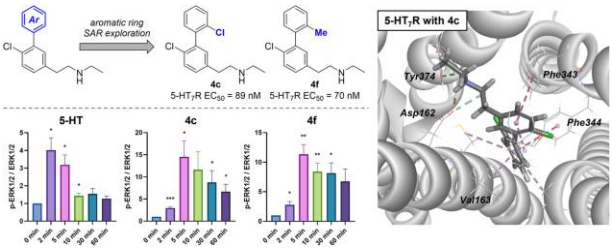
Malignant melanoma has the highest mortality rate among skin cancers due to its aggressiveness and metastatic potential, and early diagnosis is important because treatment options are limited. We synthesized a brominated benzamide derivative labeled with ^{68}Ga and evaluated its biological properties as a PET imaging probe. The radiochemical yield was over 95%, and the purity was over 98%. High uptake and tumor visualization were confirmed in B16F10 cells and mouse models, showing that ^{68}Ga-MI-0202E1 has the potential as a PET imaging probe for melanoma diagnosis.

Bull. Korean Chem. Soc. **2025**, *46*, 540-546. https://doi.org/10.1002/bkcs.70024

C

Biphenylyl-*N*-ethylethanamines induce ERK phosphorylation through 5-HT$_7$R-Gs signaling pathway

Eunseo Park, Jieon Lee, Jinhyuk Kim, Gyeongmin Kim, Hyunah Choo, Taek Kang, Byungsun Jeon, Ansoo Lee



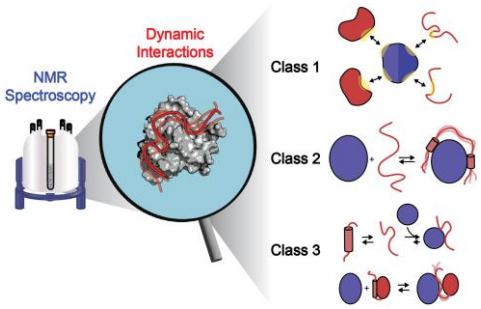
Novel biphenylyl-*N*-ethylethanamines, synthesized as 5-HT$_7$R agonists, activate the Gs signaling pathway. Compounds **4c** and **4f**, with EC_{50} values of 89 and 70 nM, show prolonged ERK phosphorylation compared to 5-HT. Exhibiting acceptable drug-like properties, **4f** emerges as a potent 5-HT$_7$R modulator, offering a promising pharmacological profile for future therapeutic exploration.

Bull. Korean Chem. Soc. **2025**, *46*, 636-640. https://doi.org/10.1002/bkcs.70030Digital

R

Dynamic protein interactions probed by NMR spectroscopy

Jaeseok Lee, Jung Ho Lee

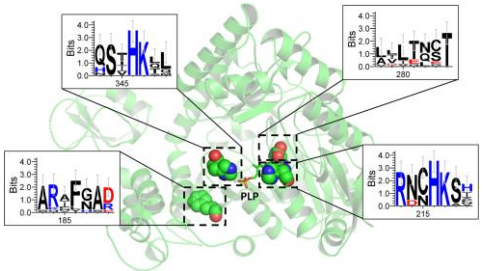


Bull. Korean Chem. Soc. **2025**, *46*, 680-690. https://doi.org/10.1002/bkcs.70036

A

Insight into the functional and structural relationship of ornithine decarboxylase and its mutants from *Lacticaseibacillus rhamnosus*

Nonvide Nicolas Adiko, Hyeon Tae Seo, Dae-Won Ki, Jung Hee Park, Da Som Kim



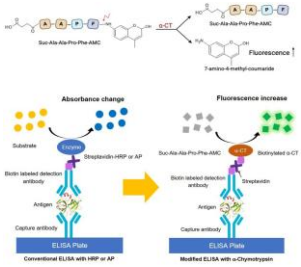
Structural and functional analysis of *Lactaseibacillus rhamnosus* ODC highlights a key residue influencing PLP binding, enzymatic activity, and crystal structure, providing insight into its catalytic mechanism.

Bull. Korean Chem. Soc. **2025**, *46*, 730-742. https://doi.org/10.1002/bkcs.70035

A

Protease-associated enzyme-linked immunosorbent assay for detecting matrix metalloproteinase-9

Saodat Nurulloeva, Yeon-Ju Lee, Hana Cho, Dong-Sik Shin



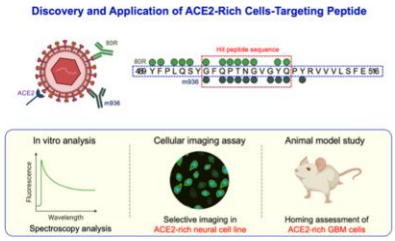
A fluorescence enzyme-linked immunosorbent assay (ELISA) method using biotinylated α-chymotrypsin (α-CTB) was developed for sensitive matrix metalloproteinase-9 detection. α-CTB retained its activity after biotinylation and immobilization. Compared to a conventional horseradish peroxidase-based ELISA, the α-CTB-based ELISA demonstrated superior sensitivity, highlighting its potential as an alternative reporter for biomarker detection.

Bull. Korean Chem. Soc. **2025**, *46*, 796-802. https://doi.org/10.1002/bkcs.70046

A

ACE2-rich cells-targeted fluorescence imaging using newly discovered peptides from SARS-CoV-2 epitopes and neutralizing antibodies

Jaehui Lee, Do-Yeon Kim, Ju Hyeon Park, Nam Cheol Hwang, Jong Min An, Dokyoung Kim



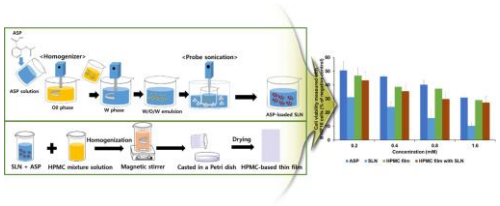
A targeting peptide for ACE2-overexpressing cells was identified and labeled with rhodamine. Fluorescence imaging demonstrated selective peptide binding to ACE2-rich cells both in vitro and in vivo. Notably, the peptide accumulated in glioblastoma tissues in a mouse model, suggesting its potential for brain tumor targeting.

Bull. Korean Chem. Soc. **2025**, *46*, 803-812. https://doi.org/10.1002/bkcs.70050

A

Preparation and evaluation of hydroxypropyl methylcellulose-based film incorporated with aspirin-loaded solid lipid nanoparticles to treat skin cancer

Sooho Yeo, Min Je Kim, Bomin Kim, Il Yoon, Woo Kyoung Lee



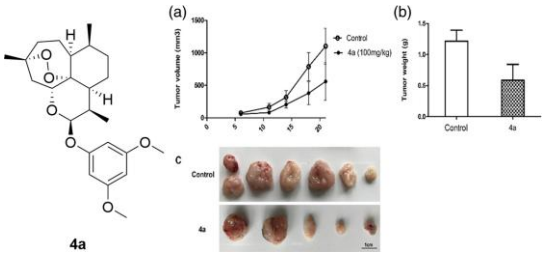
We developed hydroxypropyl methylcellulose-based thin films containing aspirin-loaded solid lipid nanoparticles prepared via the water-in-oil-in-water emulsion method. The formulation enhanced anti-cancer efficacy in skin cancer cells by 1.55 times (SLNs) and 1.28 times (films) compared to aspirin solution, suggesting potential for skin cancer therapy.

Bull. Korean Chem. Soc. **2025**, *46*, 821-829. https://doi.org/10.1002/bkcs.70053

C

Effects of phenoxyartemisinin derivatives on the inhibition of colorectal cancer and cancer stem cells

Nam Hyun Kim, Seokjoon Lee, Woon-seob Shin, Sangtae Oh

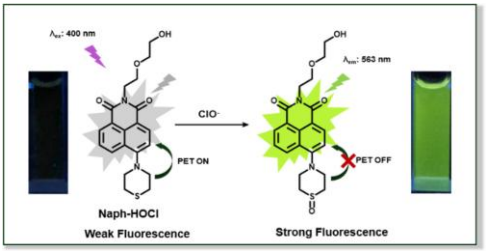


In this study, we investigate the anticancer properties of phenoxyatemisinin (**4**) among acetal-type artemisinin derivatives by evaluating their growth inhibitory effects on colon cancer cells and CSCs. Given their established role as potent antimalarial agents and their emerging potential in oncology, artemisinin-based compounds offer a promising avenue for cancer therapy.

Bull. Korean Chem. Soc. **2025**, *46*, 778-783. https://doi.org/10.1002/bkcs.70047

A sensitive naphthalimide-thiomorpholine derivative as a turn-on fluorescent probe for monitoring hypochlorite ions

Maxine Mambo Fortibui, Minju Kang, Sang Hyun Lee, Min Hee Lee

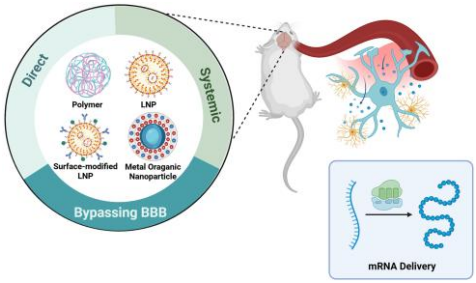


Hypochlorite ion (ClO^-) is essential for sterilization in aqueous systems but causes harmful oxidation at high levels. We present Naph-HOCl, a water-soluble naphthalimide–thiomorpholine probe for ClO^-, showing rapid fluorescence at 563 nm with high selectivity, a low detection limit of 287 nM, high signal-to-noise ratio, and potential for analytical applications.

Bull. Korean Chem. Soc. **2025**, *46*, 1014-1017. https://doi.org/10.1002/bkcs.70064

Delivery strategies of messenger RNA therapeutics for brain disorders

Kounghwa Youn, Sunmin Oh, Hyunchae Gil, Yongseok Choi, Gyochang Keum, Eun-Kyoung Bang



Thus, mRNA therapeutics offer a powerful new avenue for the treatment of brain diseases. This review examines strategies to bypass biological barriers, particularly the blood–brain barrier, and explores emerging delivery systems, such as direct intracerebral injection, intracerebroventricular injection, systemic delivery (including intravenous targeting, passive, and assisted delivery), and immune cell-mediated and non-immune cell-mediated approaches, to advance neurotherapeutics.

Bull. Korean Chem. Soc. **2025**, *46*, 1186-1204. https://doi.org/10.1002/bkcs.70083

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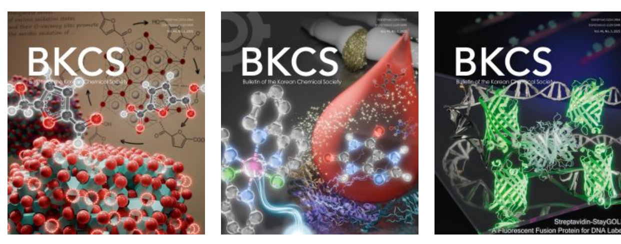

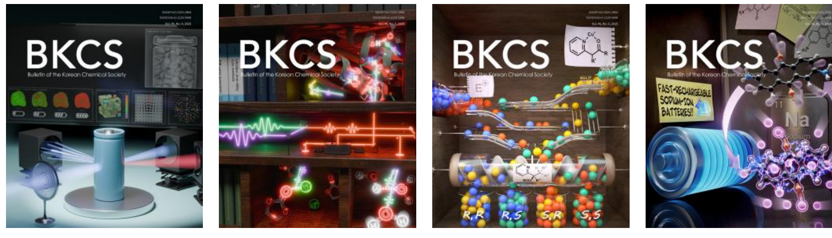

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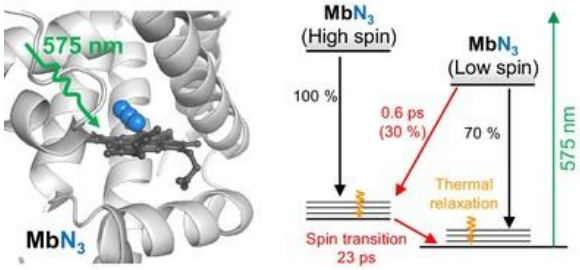
A

Photoexcitation dynamics of azide ion bound ferric myoglobin probed by femtosecond infrared spectroscopy

Seongchul Park, Jooyoung Kim, Manho Lim

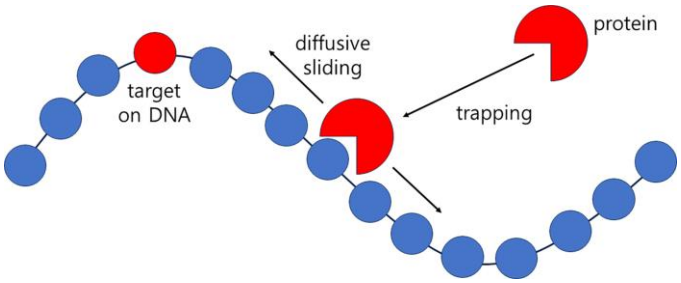


Bull. Korean Chem. Soc. **2024**, *45*, 171-177. https://doi.org/10.1002/bkcs.12803

A

Dimensionality reduction in diffusion–reaction systems

Kihyun Park, Taejun Kim, Hyojoon Kim



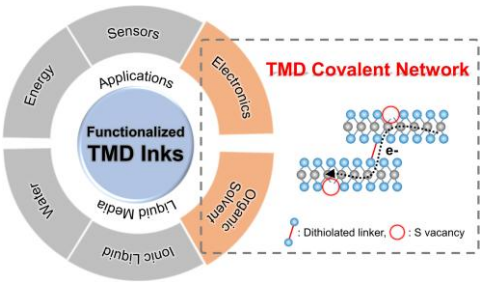
One example of dimensionality reduction is protein-DNA binding which can be greatly facilitated when the protein nonspecifically binds to a random site on the DNA and then slides diffusively along the DNA.

Bull. Korean Chem. Soc. **2024**, *45*, 178-182. https://doi.org/10.1002/bkcs.12808

P

Functionalized 2D transition metal dichalcogenide inks via liquid-phase exfoliation for practical applications

Yeonsu Jeong, Paolo Samorì

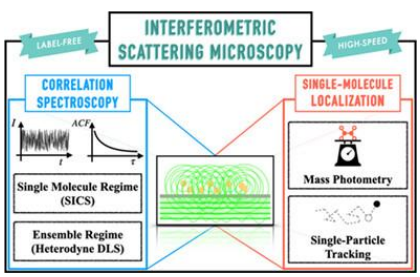


Bull. Korean Chem. Soc. **2024**, *45*, 110-124. https://doi.org/10.1002/bkcs.12807

R

Upgrading interferometric scattering microscopy with ensemble statistical analysis

Minsu Lee, Seok-Cheol Hong, Minhaeng Cho

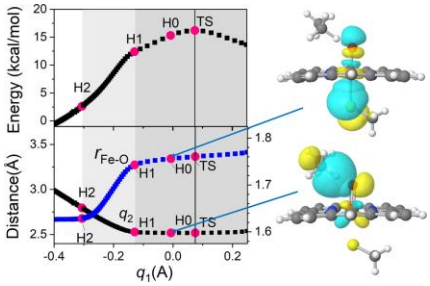


Interferometric scattering (iSCAT) microscopy is a high-speed imaging and tracking technique operating at 1000 FPS, capable of label-free imaging. It has demonstrated its versatility in measuring the mass and 3D positions of nanoparticles and biomolecules, as well as visualizing nanoscale events in complex cellular environments. However, quantifying iSCAT signals has proven challenging due to error-prone post-processing and a lack of statistical reliability in defining iSCAT contrast. To address these issues, this perspective introduces an alternative approach using correlation spectroscopy and ensemble statistical analysis. Correlation spectroscopy offers a more robust framework for signal analysis, while ensemble statistical analysis involves studying a higher density of scatterers, potentially providing more accurate information from fluctuating iSCAT signals. This perspective seeks to improve the accuracy and reliability of iSCAT microscopy, particularly in understanding dynamic processes at the nanoscale.

Bull. Korean Chem. Soc. **2024**, *45*, 32-44. https://doi.org/10.1002/bkcs.12800

A theoretical study for the linear free energy relationship of C–H bond activation and the role of the axial ligand in cytochrome P450 model complexes

Soobin Kwon, Yun-Cheol Choi, Yongho Kim

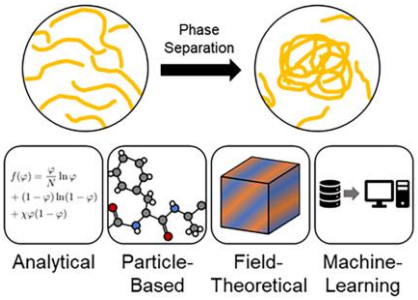


The Fe-O bond utilize σ^*_{Fe-O} and π^*_{Fe-O} orbitals to accept electrons from axial ligands and the C-H bond, respectively. These two orbitals independently but cooperatively increase the Fe-O bond length for C-H bond activation, however, there is no direct orbital interaction between axial ligands and the C-H bond, hindering a clear correlation between reactivity and axial ligand electron donation.

Bull. Korean Chem. Soc. **2024**, *45*, 284-292. https://doi.org/10.1002/bkcs.12819

Biomolecular phase separation through theoretical and computational microscope

Rajeev Kumar, Da-Hyun Koo, Yu-Gon Eom, Jeong-Mo Choi

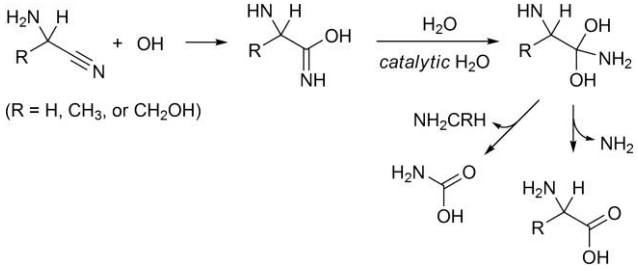


This review covers computational methods to simulate biomolecular phase separation: analytical methods, particle-based simulations, field-theoretic methods, and machine-learning methods.

Bull. Korean Chem. Soc. **2024**, *45*, 420-434. https://doi.org/10.1002/bkcs.12840

Mechanisms of interstellar synthesis of glycine, alanine, and serine from aminonitriles, OH, and H_2O

Joong Chul Choe

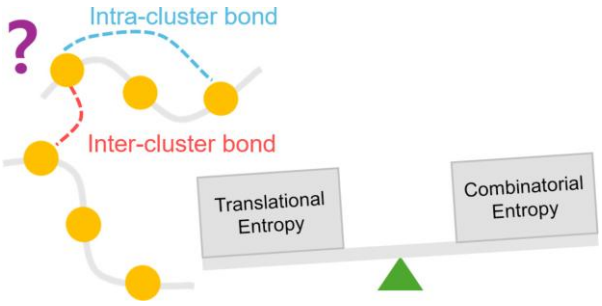


Barrierless pathways for the formation of glycine, alanine, and serine from aminonitriles, OH, and H_2O with catalytic H_2O were obtained using CBS-QB3 calculation, suggesting possible occurrence of the thermal reactions in interstellar ices.

Bull. Korean Chem. Soc. **2024**, *45*, 520-525. https://doi.org/10.1002/bkcs.12844

Combinatorial entropy determines the early stages of nucleation

Da-Hyun Koo, Ho Jun Park, Jeong-Mo Choi



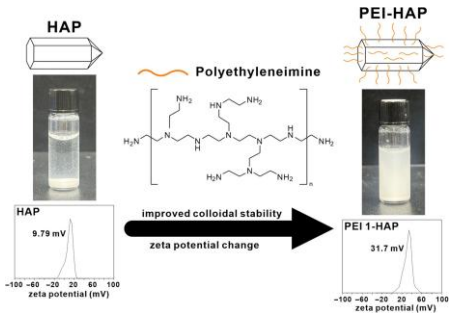
This research highlights the pivotal role of combinatorial entropy in the early stages of percolation dynamics, employing graph-theoretic simulations. It provides novel insights into nucleation behavior, with implications spanning material design to biological systems.

Bull. Korean Chem. Soc. **2024**, *45*, 526-529. https://doi.org/10.1002/bkcs.12849

A

Polyethyleneimine incorporated hydroxyapatite for improved colloidal stability

Hyebin Choi, Jaun An, Keunyoung Lee, Ki-Young Kwon



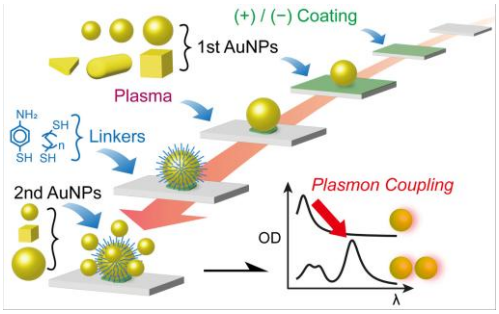
The PEI incorporated hydroxyapatite (PEI-HAP) was prepared by hydrothermal synthesis at 200 °C using a mixture of HAP synthesized at room temperature and PEI solutions. As the amount of PEI increases, zeta potential value become more positive and the colloidal stability of the sample improved. It was attributed to the presence of amines on the surface of HAP preventing the aggregation of HAP.

Bull. Korean Chem. Soc. **2024**, *45*, 614-619. https://doi.org/10.1002/bkcs.12855

P

Controlled assembly of gold nanoparticles: Methods and plasmon coupling properties

Sangwoon Yoon



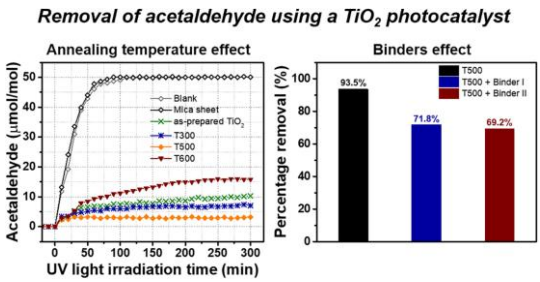
The newly developed controlled assembly method allows us to prepare gold nanoparticle assemblies consisting of various nanoparticle shapes, sizes, and gap distances. Such nanoassemblies reveal the relationship between the plasmon coupling and the nanogap structural parameters.

Bull. Korean Chem. Soc. **2024**, *45*, 689-698. https://doi.org/10.1002/bkcs.12886

A

TiO_2 for efficient photocatalytic decomposition of acetaldehyde: An investigation of the effects of annealing temperature, humidity, and binder

Yong-Sog Kwon, Kyu-Chul Jung, Shufang Zhao, Yujing Ji, Shahid Saqlain, Young Dok Kim



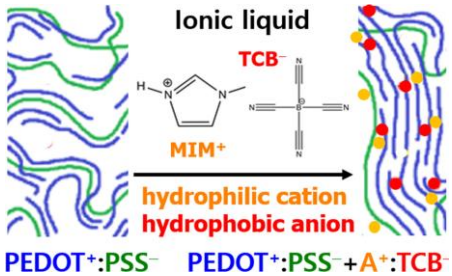
This work demonstrates that annealing temperature can remarkably influence the physico-chemical properties of TiO_2 photocatalysts which eventually affect their photocatalytic performance for environmental applications. Humidity and binders may have significant impact on the photocatalytic removal efficiency as well as on the extent of total oxidation of VOCs like acetaldehyde.

Bull. Korean Chem. Soc. **2024**, *45*, 706-719. https://doi.org/10.1002/bkcs.12887

P

Stretchable conducting polymer PEDOT:PSS treated with hard-cation-soft-anion ionic liquid designed from molecular modeling

Yves Lansac, Changwon Choi, Yun Hee Jang

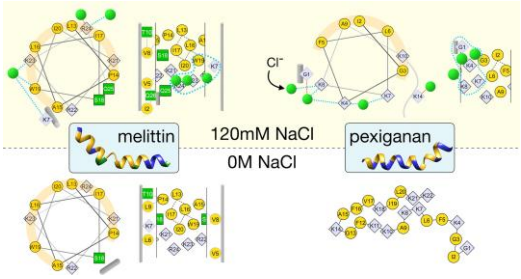


Ion exchange between PEDOT:PSS and ionic liquid (IL) leads to PEDOT-PSS separation and PEDOT self-assembly into fibular conductive pathways. IL composition dramatically affects the PEDOT-PSS separation and the π–π stacking in PEDOT domains. IL with soft (hydrophobic) anion and hard (hydrophilic) cation is proposed for efficient PEDOT:PSS treatment.

Bull. Korean Chem. Soc. **2024**, *45*, 896-905. https://doi.org/10.1002/bkcs.12908

A Unraveling the role of counter ions in shaping the structures of helical peptides in aqueous phase

Jeseong Yoon, Youngbeom Jo, Seokmin Shin

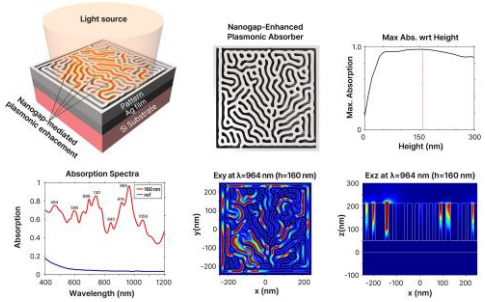


We conducted molecular dynamics simulations to investigate how counter ions influence the structural characteristics of a peptide in solution. By utilizing an extended form of helical projection, we distinctly characterized structural traits and elucidate the underlying principles of structure formation, which are often challenging to discern in conventional approaches.

Bull. Korean Chem. Soc. **2024**, *45*, 1000-1014. https://doi.org/10.1002/bkcs.12914

C Broadband plasmonic response of silver nanomaze-based nanogap-enhanced absorber

Kinam Jung, Yongtaek Lee

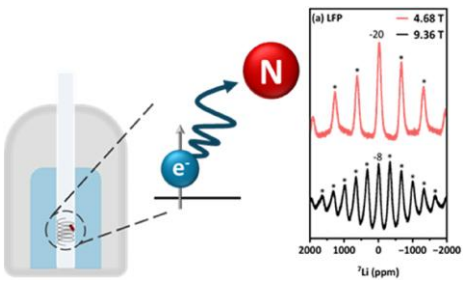


A novel nanogap-enhanced plasmonic absorber is designed using the Gray–Scott algorithm, featuring a complex nanomaze pattern. Finite-difference time-domain simulations reveal broadband absorption and multiple resonance features. The structure exhibits unique electric field distributions, demonstrating effective light trapping across a wide wavelength range and promising significant advancements in nanophotonics.

Bull. Korean Chem. Soc. **2024**, *45*, 906-910. https://doi.org/10.1002/bkcs.12904

A Effect of the field strength on the MAS NMR spectra: Comparative study between diamagnetic and paramagnetic systems

Yoonju Shin, Sunghee Min, Sangdoo Ahn, Young Joo Lee

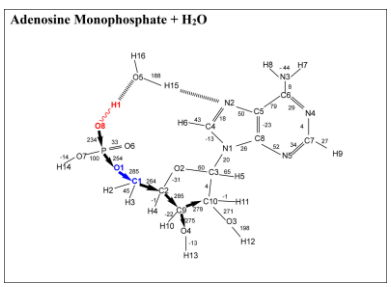


This study shows that NMR spectral features vary depending on the magnetic field strength, in particular for paramagnetic systems containing unpaired electrons. Thus, understanding the effect of the interaction between nuclei and electrons is important to acquire and interpret NMR spectra, enabling investigation of the cathode and anode materials for Li rechargeable batteries.

Bull. Korean Chem. Soc. **2025**, *46*, 77-84. https://doi.org/10.1002/bkcs.12928

A Vibrational relaxation and energy distribution in adenosine monophosphate

Jongbaik Ree, Kyoung Chul Ko, Hyung Kyu Shin



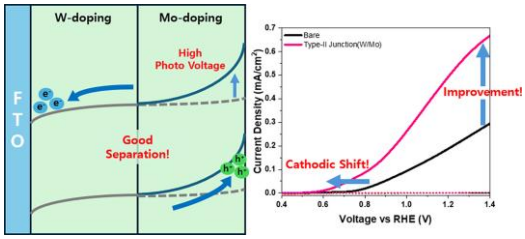
The initial excitation stored in the phosphate OH vibration of a hydrogen-bonded adenosine monophosphate is shown to mainly redistribute in the ribose moiety through efficient energy pumping by the phosphoester bond. In the ribose unit, energy travels the carbon–carbon pathway and distributes mainly in the C–O–H side chains.

Bull. Korean Chem. Soc. **2025**, *46*, 85-91. https://doi.org/10.1002/bkcs.12927

A

Enhancement of the photoelectrochemical performance of bismuth vanadate ($BiVO_4$) photoanode by building a W:$BiVO_4$/Mo:$BiVO_4$ homojunction

Ji Hyun Kim, Seung Hyeon Jeong, Aram Hong, Zhenhua Pan, Kenji Katayama, Woon Yong Sohn

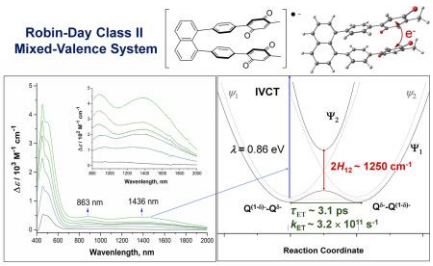


Bull. Korean Chem. Soc. **2025**, *46*, 301-309. https://doi.org/10.1002/bkcs.12943

A

Through-space electronic coupling in π-stacked organic mixed-valence systems: A quantitative comparison of cationic and anionic states

Dohoon Jeon, Kyu Cheol Cho, Youn K. Kang



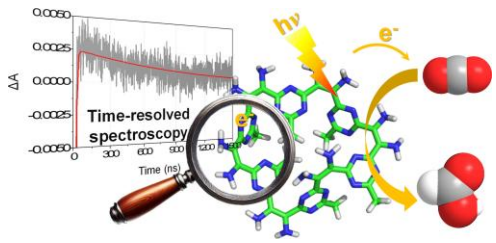
A quantitative study comparing through-space electronic coupling in cationic and anionic mixed-valence systems. H_{12} values were obtained from intervalence charge transfer band analysis via spectroelectrochemistry, while structural insights were derived from density functional theory calculations. Results reveal key factors influencing charge transfer in π-stacked regimes.

Bull. Korean Chem. Soc. **2025**, *46*, 281-292. https://doi.org/10.1002/bkcs.70007

A

Enhanced photocatalytic CO_2 reduction of covalent triazine-based photocatalyst: Mechanistic insights from time-resolved spectroscopy

Rajesh K. Yadav, Seung Yeon Choi, Satyam Singh, Tae Wu Kim



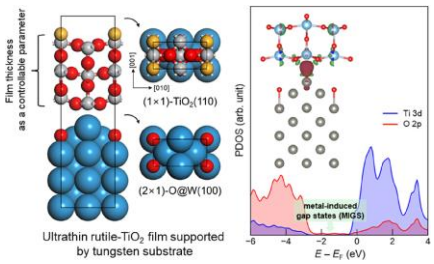
We investigated the photochemical properties of triazine-based heterogeneous photocatalysts during the carbon dioxide reduction reaction by employing time-resolved optical spectroscopies. This study shed light on the photo-physical phenomena–catalytic function relationship at the molecular level.

Bull. Korean Chem. Soc. **2025**, *46*, 441-447. https://doi.org/10.1002/bkcs.70013

A

Impact of film thickness on the geometric and electronic characteristics of ultrathin rutile-TiO_2(110) films supported by metal substrates

Rizky Hadiputra, Jaehoon Jung



DFT calculations are performed to study the thickness-dependent geometric and electronic properties of ultrathin rutile-TiO_2 films on bcc metal substrates, of which W and Mo were identified as suitable for film formation. The interfacial electronic structure, characterized by charge transfer from metal to TiO_2 layer via MIGS, can rationalize the thickness-dependent variation in work function.

Bull. Korean Chem. Soc. **2025**, *46*, 448-454. https://doi.org/10.1002/bkcs.70014

P

MRSF-TDDFT: A new tool in quantum chemistry for better understanding molecules and materials

Woojin Park, Seunghoon Lee, Konstantin Komarov, Vladimir Mironov, Hiroya Nakata, Tao Zeng, Miquel Huix-Rotllant, Cheol Ho Choi

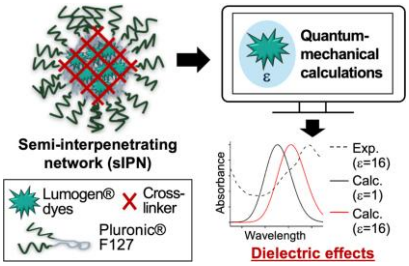
MRSF-TDDFT is a revolutionary quantum chemical method addressing challenges in complex systems and excited states. Combining high accuracy comparable to advanced quantum theories with the efficiency of TDDFT, it empowers precise investigations of molecular behaviors, including doubly excited states and conical intersections, paving the way for innovative material design and photochemical insights.

Bull. Korean Chem. Soc. **2025**, *46*, 330-346. https://doi.org/10.1002/bkcs.70011

A

Dielectric environment effects on rylene-based organic fluorophores: A quantum mechanical study

Larissa Kupriyanova, Banyu Firdaus Soeriawidjaja, Juyoung Hwang, Myeongkee Park, Minseok Kwak, Yeonjoon Kim



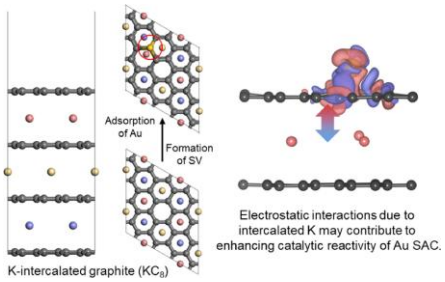
Quantum-mechanical calculations were used to study the absorption properties of Lumogen® dyes. Absorption wavelengths were calculated and compared with experiments. Structural features and solvent effects were analyzed to explain wavelength shifts. Statistical analysis confirmed these trends, enabling regression models to predict rylene-based materials' absorption in various environments.

Bull. Korean Chem. Soc. **2025**, *46*, 526-539. https://doi.org/10.1002/bkcs.70023

A

Facilitating CO oxidation reactivity via potassium intercalation on a single-atom gold catalyst supported by graphite

Rizky Hadiputra, Minhui Lee, Jaehoon Jung



Density functional theory calculations reveal that K-intercalated graphite (K@Gr) enhances CO oxidation on Au single-atom catalysts (SACs) by stabilizing key intermediates through strong electrostatic interactions, making it a promising support material.

Bull. Korean Chem. Soc. **2025**, *46*, 547-553. https://doi.org/10.1002/bkcs.70025

A

Dual-atom catalyst design for efficient hydrazine oxidation reaction: A density functional theory study

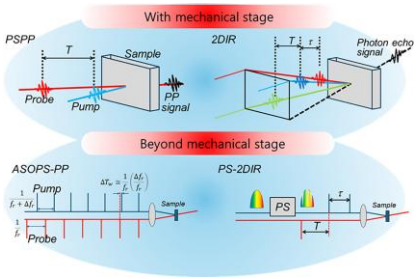
Hyeonwoo Kim, Hanna Jeon, Hyeyoung Shin

Dual-atom catalysts (DACs), consisting of either noble—non-noble or non-noble—non-noble metal pairs, enable efficient hydrazine oxidation by reducing Gibbs free energy barriers while lowering material costs. Density functional theory (DFT) calculations reveal that NiCo DACs optimize intermediate adsorption and electronic properties, offering a promising strategy for high-efficiency hydrogen production.

Bull. Korean Chem. Soc. **2025**, *46*, 554-561. https://doi.org/10.1002/bkcs.70026

Frontier femtosecond mid-infrared pump-probe and 2DIR techniques: Advances in experimental methodologies

Joongwon Shim, Kwanghee Park, Minhyuk Lee, Minharng Cho, JunWoo Kim, Kyungwon Kwak

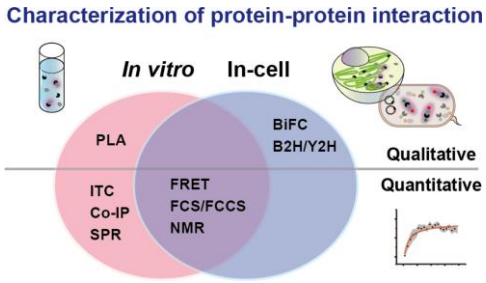


MIR femtosecond experiments are categorized into two types. In optical amplifier-based experiments, time delay is generated using either a pulse shaper or a mechanical delay stage. Experiments utilizing repetition rate-stabilized laser oscillators employ asynchronous optical sampling (ASOPS) by slightly detuning the repetition rates of two oscillators, enabling automatic time delay scanning.

Bull. Korean Chem. Soc. **2025**, *46*, 458-467. https://doi.org/10.1002/bkcs.70020

Advances in methodologies for quantifying protein–protein interactions in living cells

Soojung Yi, Yejin Ahn, Nam Ki Lee

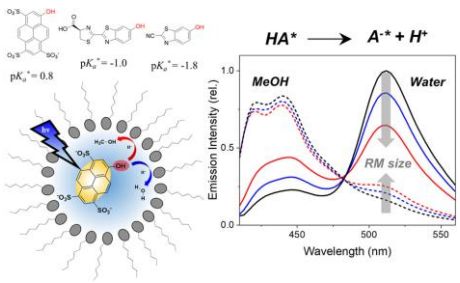


Measuring the binding affinities of protein–protein interactions (PPIs) is important for understanding underlying biological mechanisms. As methods for studying PPIs differ between in vitro and in-cell conditions due to environmental differences, it is crucial to stay informed about recent trends and methodologies in both experimental contexts.

Bull. Korean Chem. Soc. **2025**, *46*, 574-586. https://doi.org/10.1002/bkcs.70028

Excited-state proton transfer of weak and medium-strength photoacids in confined methanol-in-oil reverse micelles

Taehyung Jang, Yoonsoo Pang



Excited-state proton transfer dynamics of weak and medium-strength photoacids in reverse micelles with water and methanol cores exhibit strong micelle-size dependences. In small micelles, proton transfer rates (~10^9 s^{-1}) of these photoacids display minimal dependence on solvent acidity, indicating that restricted solvation dynamics within the confined nanopools may control the reaction dynamics

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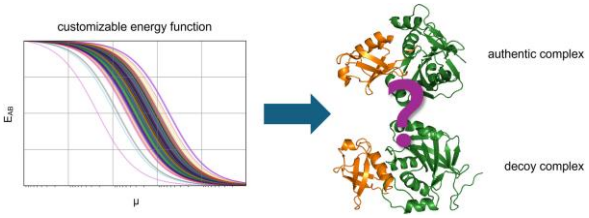
Design principles of protein–protein interfaces

Chan-Gyu Kim, Tae Hwan Kim, Jeong-Mo Choi



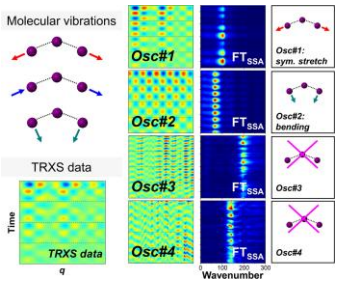
This study explores the energy landscape of protein–protein complexes using a simple, tunable energy model. It highlights the importance of residue pair differences in distinguishing real complexes from decoys, offering insights into key principles of protein binding. Though qualitative, the findings may inform improved energy functions and structural prediction models.

Bull. Korean Chem. Soc. **2025**, *46*, 791-795. https://doi.org/10.1002/bkcs.70051

A

Integrative analysis framework for discerning oscillatory signals associated with molecular vibrations from time-resolved X-ray scattering data

Jaeseok Kim, Hyunwoo Jeong, Jong Goo Kim



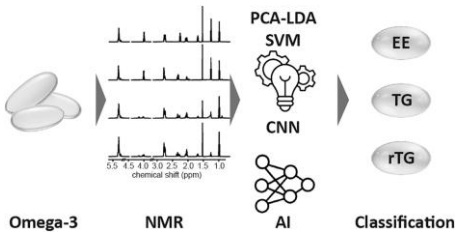
We present an integrative analysis framework that employs singular spectrum analysis and posterior structural analysis to extract subtle oscillatory signals from time-resolved X-ray scattering data and verify their physical relevance to molecular vibrations. This framework offers an efficient and reliable analytical tool for studying molecular vibrations and ultrafast reaction dynamics.

Bull. Korean Chem. Soc. **2025**, *46*, 887-898. https://doi.org/10.1002/bkcs.70055

A

Discrimination of omega-3 fatty acid oil forms by combining NMR spectroscopy with artificial intelligence

Neulhwi Yeo, Jung Min Han, Mi Gang Kim, Jin Young Kim, Hyojin Cho, Seon Yeong Lee, Joong-Hyuck Auh, Byung Hee Kim, Sangdoo Ahn



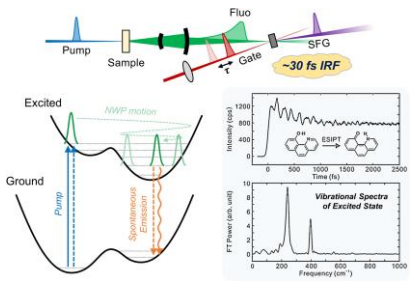
This study investigates the classification of omega-3 oil forms using NMR spectroscopy combined with machine learning and deep learning approaches. Among the models evaluated, the CNN based on deep learning demonstrated the highest performance in discriminating the three different forms of omega-3 oils.

Bull. Korean Chem. Soc. **2025**, *46*, 899-906. https://doi.org/10.1002/bkcs.70056

R

Ultrafast time-resolved fluorescence for probing vibrational wave packets in excited-state dynamics

Munnyon Kim, Wooseok Heo, Taiha Joo



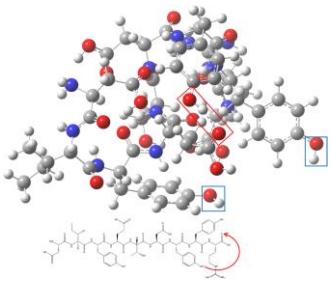
With the advances in time resolution, time-resolved fluorescence (TF) enables observation of excited-state dynamics, including kinetics, structural information, and vibrational spectra of emissive species. Combined with quantum chemical calculations, TF becomes an indispensable tool for studying chemical dynamics and spectroscopy.

Bull. Korean Chem. Soc. **2025**, *46*, 834-845. https://doi.org/10.1002/bkcs.70054

A

UV and IR spectroscopy of singly protonated DIYETDYYR, a tryptic peptide from the regulatory loop of insulin receptor

Hyo Nam Jeon, Shun-ichi Ishiuchi, Masaaki Fujii, Hyuk Kang



The structure of singly protonated DIYETDYYR, which is a tryptic peptide in the regulatory loop of the insulin receptor, was determined by cryogenic ion spectroscopy.

Bull. Korean Chem. Soc. **2025**, *46*, 1212-1219. https://doi.org/10.1002/bkcs.70086

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