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Editorial

Gold, Silver and Copper Catalysis

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In terms of catalysis, the exploration of novel materials and innovative methodologies continues to drive the field forward, offering solutions to pressing challenges in various industrial applications. This Special Issue of *Catalysts* stands as a testament to the cutting-edge research and groundbreaking discoveries in gold, silver, and copper catalysis.

The diverse collection of research papers featured in this issue showcases the versatility and potency of these metallic catalysts across a spectrum of catalytic processes. From the design of new in situ catalysts based on nitro-functional pyrazole derivatives and copper(II) salts to actively promote the oxidation of catechol to o-quinone (contribution 1) to the exploration of heterogeneous gold nanoparticle-based catalysts (contribution 2) and carbon-supported Cu(I)-phosphine complexes (contribution 3) to synthesize click-derived triazoles, the scope of the contributions is both broad and deep. The synthesis and application of acenaphthene-based N-heterocyclic carbene metal complexes was also reviewed (contribution 4).

Another significant theme explored in this Special Issue is the development of advanced photocatalysts based on Ag, TiO_2, and 1-butyl-3-methyl imidazolium chloride for the degradation of Rhodamine B (contribution 5). In addition, the study on hydrogen production and the degradation of ciprofloxacin using Ag@TiO_2-MoS_2 photocatalysts (contribution 6) represents a step forward in harnessing the power of silver and titanium dioxide composites to address environmental and pharmaceutical challenges simultaneously. Another paper focuses on the use of $AgNO_3$ as a coating agent to efficiently preserve papers against microbial deterioration (contribution 7).

Another notable area of focus is the strategic use of bimetallic catalysts. Investigating the effect of the metal deposition order on the structural, electronic, and catalytic properties of TiO_2-supported bimetallic Au-Ag catalysts provides valuable insights into tailoring catalysts for specific applications, such as 1-octanol selective oxidation (contribution 8).

The interplay between shape effects and catalytic performance is examined in the study on ceria nanoparticles, shedding light on how the morphology of these materials influences the water–gas shift performance of CuO_x/CeO_2 catalysts (contribution 9). The production of hydrogen was the subject of another paper, where the catalytic activity of beta-cyclodextrin capped gold nanoparticles was tested in the hydrolysis reaction of sodium borohydride (contribution 10).

Furthermore, the Special Issue delves into the catalytic degradation of various pollutants, including the Cu-catalyzed hydrodehalogenation of brominated aromatic pollutants and the Cu-catalyzed reactions of aryl halides with N-nucleophiles (contributions 11–13), showcasing the potential of copper-based catalysts in environmental remediation.

2-nitro-5,10,15,20-tetra(4-trifluoromethylphenyl)porphyrin covalently linked to nanodiamonds (ND@βNH-TPPpCF3), without phytotoxicity or cytotoxicity, was evaluated as a reusable catalyst in cyclohexene allylic oxidation, with excellent results (contribution 14).

These papers collectively underscore the dynamic nature of the research into gold, silver, and copper catalysis. From the development of new materials to the application of these catalysts in diverse chemical transformations, the contributions in this Special Issue significantly contribute to the advancement of catalysis science.

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As guest editor, I extend my gratitude to the authors for their exceptional work and dedication to advancing our understanding of gold, silver, and copper catalysis and my appreciation to the dedicated staff members at MDPI for their invaluable editorial support. As we navigate the complexities of modern challenges, this Special Issue stands as a valuable resource, providing a platform for researchers and practitioners to explore, collaborate, and innovate in the ever-evolving field of catalysis.

I hope that this compilation of research articles not only serves as a testament to the current state of the field but also inspires future investigations, paving the way for even more important developments in the realm of catalysis.

I am confident that readers will discover the papers featured in this Special Issue to be insightful and engaging illustrations of the application of gold, silver and copper nanoparticles in catalytic processes.

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