

第9回精密無機材料化学研究セミナー

演題 Precision Nanoclusters: New Directions and Applications

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日時 2026年10月31日(土) 13:00～14:00

場所 南総合研究棟2号館 4階 セミナー室 421

主催 多元物質科学研究所 精密無機材料化学研究部門



講演内容

Atomically precise metal nanoclusters (NCs) provide an ideal platform for constructing functional supramolecular materials with tunable optical, catalytic, and electronic properties. This talk presents recent advances in the light-induced self-assembly of Au₂₅ NCs functionalized with azobenzene and coumarin chromophores, yielding distinct disc-like and toroidal superstructures through photoisomerization- and photocycloaddition-driven pathways, respectively. The influence of chromophore architecture on assembly behavior, guest encapsulation, and controlled release will be discussed. The presentation will further highlight assembly-induced photoluminescence enhancement in gold-copper bimetallic NCs and their integration into light-emitting devices. Subsequently, the use of redox-active NCs for switchable electrocatalysis, enabling dynamic control over catalytic selectivity through molecular and supramolecular design, will be showcased. Finally, the role of metal complexation in promoting efficient energy conversion processes will be discussed. Collectively, these studies demonstrate how atomically precise NCs can serve as versatile building blocks for designing next-generation photonic, energy, and catalytic materials.

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