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RESEARCH & COLLABORATION PROFILE

KEY WORDS: Supramolecular Chemistry, Coordination Chemistry, Molecular Photoswitches, Circularly Polarized Luminescence

Research Snapshot. Prof. Tessarolo uses coordination chemistry and self-assembly as a toolbox to develop complex supramolecular structures starting from relatively simple building blocks. The research spans from controlling size and shape of discrete metal-organic supramolecules to implementing multiple functions in the same framework. Emphasis is given to host-guest system for molecular recognition or confined space reactivity, combination of chiral and optically active moieties to achieve chiroptical properties, and the implementation of stimuli responsive building blocks such as molecular photoswitches.

RESEARCH EXPERTISE

- **Structural Studies:** Single-crystals X-ray diffraction with in-house and synchrotron sources and NMR analysis are used to characterize large supramolecular systems with confined cavities.
- **Organic-Inorganic synthesis:** Synthesis of organic ligands and coordination complexes, including microwave assisted synthesis.
- **Host-Guest Chemistry:** molecular recognition of small guest molecules or ions studied by NMR or optical spectroscopies.
- **Chiroptical Properties:** Optical characterization of chromophores and chiral chromophore systems by circular dichroism (CD) and circularly polarized luminescence (CPL).
- **Molecular Photoswitching:** light-triggered structural transformations by specific LED irradiation.

RECENT RESEARCH HIGHLIGHTS

- **Charge separation in heteroleptic cages** (*Angew. Chem. Int. Ed.*, **2026**): ligand-to-ligand charge separation in precisely arranged photoredox-active components
- **Chiral heteroleptic cages** (*Chem* **2026**): Low-symmetric structures combining chirality and chromophores.
- **Photoswitchable coordination cages** (*Nat. Chem.*, **2024**): light-triggered molecular transformation are coupled with dynamic equilibrium of self-assembled systems.

POTENTIAL COLLABORATION RESEARCH

Best-fit collaborator areas: Computational Chemistry | Mass analysis | Photochemistry and Electrochemistry

1. **High-resolution mass and ion-mobility:** collaboration on precise structural characterization of supramolecular arrangements in the gas phase
2. **Computational Chemistry:** collaborative investigation on structural modeling, conformational analysis and spectroscopic properties.
3. **Photochemistry:** collaboration on time-resolved investigation of precisely oriented chromophores in supramolecular systems.
4. **Stimuli responsive systems:** joint collaborations on responsive materials to light, redox or pH stimuli.

SELECTED RECENT PUBLICATIONS

- *Chem*, **2026**, *12*, 102950
- *Angew. Chem. Int. Ed.*, **2026**, 65, *e22944*
- *Chem*, **2026**, *12*, 102780
- *Small*, **2025**, *2500751*
- *Nat. Chem.*, ***2024***, *16, 13-21*

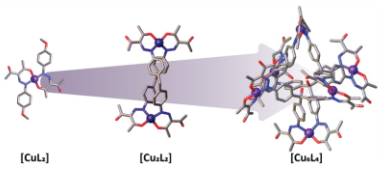
CONTACT

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https://sites.google.com/jnu.ac.kr/jtlab

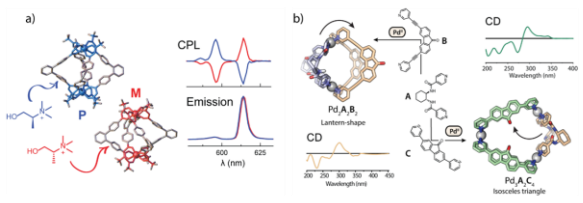
REPRESENTATIVE RESEARCH FIGURES / SCHEMES

Structural Diversity and Host-guest Chemistry



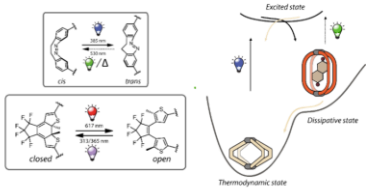
Angew. Chem. Int. Ed. **2021**, 60, 22562-22569
J. Am. Chem. Soc. **2021**, *143*, 6339
Chem, **2026**, *12*, 102780

Combining Chirality and Optical Properties



Angew. Chem. Int. Ed. **2022**, 61, e202205725
Cell Reports Physical Science **2022**, *3*, 100692
Chem. Comm, **2023**, *59*, 3467
Small, **2025**, smll.202500751

Stimuli Responsive Systems



J. Am. Chem. Soc. **2021**, *143*, 3865
J. Am. Chem. Soc. **2022**, *144*, 3099
Nat. Chem. **2024**, *16*, 13–21