

## Controlling Excited-State Dynamics in Metal Complexes: Dye-Induced Luminescence and Coordination Sphere Effects

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Luminescent transition-metal complexes are promising for applications in imaging, phototherapy, and photocatalysis. Among them, polynuclear metal complexes often have interesting photophysical properties arising from metallophilic interactions. My research explores how ligand design and coordination environments influence the photophysical properties of metal complexes. In  $d^{10}$  systems, incorporation of a dye significantly enhances photoluminescence and enables strong emission even in multinuclear clusters. Complementary studies on rhodium(I) dimers demonstrate how subtle modifications in the primary and secondary coordination spheres tune metal-metal interactions, allowing control over triplet lifetimes and near-infrared emission.

Below is an overview of her academic journey:

- University of Basel, Basel, Switzerland, Postdoctoral researcher, (August 2024-present). Walter Benjamin Fellow. Supervisor: Prof. Dr. Oliver S. Wenger
- Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany, Postdoctoral researcher (August 2023-July 2024).
- Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany, Ph.D. Chemistry (2020-July 2023). Supervisor: Prof. Dr. Peter W. Roesky
- Indian Institute of Technology, Indore, India, M.Sc. Chemistry (2017-2019), Gold medalist. Supervisors: Prof. Dr. Sanjay K. Singh and Prof. Dr. Silke Behrens
- Sri Sathya Sai Institute of Higher Learning, B.Sc. (Honors) Chemistry (2017), Gold medalist.

Dr. Naina is currently a postdoctoral researcher at the University of Basel in the Wenger group, where she develops novel polynuclear complexes for photocatalytic applications. She completed her PhD at the Karlsruhe Institute of Technology in the Roesky group, focusing on coumarin-based coinage-metal complexes, investigating their luminescence, cytotoxicity, and potential for cell imaging. She was awarded gold medals during both her Bachelor's and Master's studies and received prestigious fellowships including the German Academic Exchange Service (DAAD) scholarship for her master's studies and the Walter Benjamin fellowship from the German Research Foundation for her postdoctoral research in Basel.