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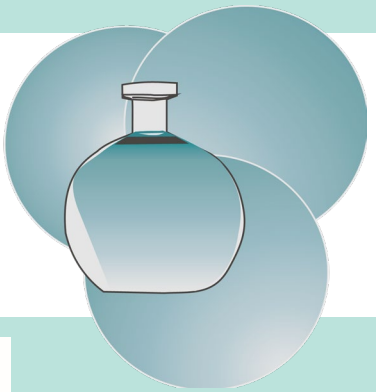

lädt ein

gemeinsam mit der Gesellschaft Deutscher Chemiker zum

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GESELLSCHAFT DEUTSCHER CHEMIKER

Vortrag

von Frau

Dr. Anna Krawczuk

Institute of Inorganic Chemistry
University of Göttingen

"From Molecular Design to Optically Active Solid-state Materials: Functionalizing π-Conjugated Systems"

am: **Dienstag, 11.02.2025**

um: 13:00 Uhr

wo: im Raum 1/232

Gäste sind herzlich willkommen!

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Fakultät für Naturwissenschaften

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GDCh
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From Molecular Design to Optically Active Solid-state Materials: Functionalizing π-Conjugated Systems

Solid-state luminescent materials composed of pure fluorescent organic molecules have garnered significant attention due to their potential applications in optics, optoelectronics, and bioimaging. However, their rational design remains a challenge as photoluminescence properties, which are highly dependent on molecular conformation and non-covalent interactions (NCI) in the solid state, are difficult to predict. In many instances, molecules that exhibit strong photoluminescence in solution experience quenching upon aggregation (aggregation-caused quenching, ACQ). Conversely, certain aggregation modes can enhance luminescent properties (aggregation-induced emission, AIE).

To address the above-mentioned challenges, one can modify the fluorophore's backbone structure to mitigate negative aggregation effects and enhance optical responses. Another approach involves carefully managing weak non-covalent intermolecular interactions within the crystalline phase to stabilize desired properties. Additionally, functionalization with metal ions can enhance fluorophore properties and introduce new functionalities, such as sensing. Moreover, applying external high pressure offers a powerful tool to tune structural and luminescent characteristics, enabling controlled structural changes and pressure-induced emission enhancement (PIEE).

In this talk, chemical, mechanical, and metal-ion-based functionalization of chosen π-conjugated crystalline materials will be discussed. All the discussed compounds have proven to be fluorescent also upon compression. The discussion will be supported by structural investigations, spectroscopic measurements, and quantum crystallography tools to elucidate the structure-property relationships and explain the mechanisms driving the modification and/or enhancement of solid-state emission.

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