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FROM INDIGOID PHOTOSWITCHES TO MOLECULAR MACHINES

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Indigoid chormophores are a class of emerging photoswitches[1,2] possessing many advantages compared to the most commonly used photoswitch motives. Despite their high potential as versatile and efficient molecular triggering unit, they have been largely overlooked by the chemistry, biology, or material science communities.

In the recent years, we have explored the interesting and somewhat unusual photophysical properties of different indigoid photoswitches such as hemithioindigo, hemiindigo, or indigo itself in depth and developed a thorough mechanistic understanding of their light induced motions and behavior in the excited state.[3,4] This fundamental knowledge allows us to tailor photoswitches with specific property profiles using strategic substitutions in combination with predictable environmental influences.

We further use indigoid chromophores to build responsive supramolecular systems with unprecedented properties[5] and next generation molecular machines.[6,7] Our main goal is to develop smart molecular entities, which can conveniently be implemented into more complex architectures to manipulate matter at the molecular scale with the highest possible precision. Key issues that we address are a complete control over the mechanics of molecular motions and the interactions between different molecular entities[8] using nondestructive visible light.

Keywords: Photoswitches, Molecular Machines, Photochemistry

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