

# Can photons generate magnetization in non-magnetic materials? - design of molecular photomagnets via the photochemical route

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Molecular photomagnets[1] can be designed and prepared via a bottom-up modular approach using low-energy preparation methods developed by coordination, organometallic or supramolecular chemistry, and crystal engineering with the support from physical and computational sciences. They belong to the class of molecule-based materials that become paramagnetic, ferromagnetic or simply change their magnetic properties upon illumination[2] - a feature hardly accessible in conventional solids - metal alloys and oxides.

Currently known photomagnetic compounds are merely laboratory curiosities due to the low operation temperatures below the boiling point of nitrogen in most cases[3]. Hence, the major goal of this field of research is the discovery of new strategies for room temperature (RT) photomagnets that would show light-induced ON/OFF ferromagnetic switching under normal conditions.

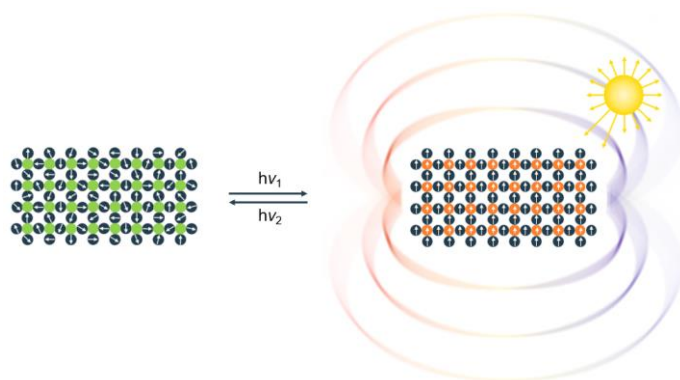


Figure 1: The concept of a molecular photomagnet – the paramagnetic state transforms into the magnetically ordered state upon illumination.

- [1] C. Mathonière, H. Tokoro, S.-I. Ohkoshi, Molecular Photomagnets. In *Molecular Magnetic Materials* (eds B. Sieklucka and D. Pinkowicz) (2017)
- 2] X. Qi, et al., *Angew. Chem. Int. Ed.* **59**, 3117 (2021)
- [3] M. Magott, et al., *J. Am. Chem. Soc.* **140**, 15876 (2018)

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