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Editorial

Photoresponsive Organic Molecular Crystals

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The Special Issue on "Photoresponsive Molecular Crystals" is a collection of four original research articles dedicated to theoretical and experimental research works providing new insights and experimental findings in the field of photoresponsive crystals.

Molecular crystals composed of photoresponsive molecules exhibit interesting behaviors and responses, which can be potentially applied in photoactuators and miniature smart devices. When the chromophores are aligned in a desired geometry, stimulating these crystals with light amplifies the invisible Angstrom (Å)-level molecular motion to an observable effect that perturbs the shape of the entire crystal. Therefore, the Special Issue aims to build a contemporary collection of recent pioneering work and advances in photoresponsive molecular crystals involving structure design, crystal engineering, material fabrication, and potential applications. We are grateful to have a few cutting-edge papers on photoresponsive molecular crystals included in this Special Issue.

Bardeen and Berges et al. first introduced a new experimental method based on the misaligned Michelson interferometer to detect the photomechanical motion generated by the photodimerization of 9-methylanthracene (9MA) nanocrystals aligned inside inorganic templates. Their results also helped define the main challenges for developing composite photomechanical materials [1]. As for crystal engineering, Li and Tong et al. used charge-transfer molecules to fabricate co-crystals with hollow chambers, providing a facile way to prepare co-crystals with complicated topology and morphology [2]. As for new photoresponsive crystals, Morimoto et al. synthesized two new photoactive compounds based on diarylethene derivatives and harvested mixed crystals by simple recrystallization. Their results also demonstrated that the hybrid diarylethene derivatives with different oxidation states in mixed crystals help prepare molecular crystals with multifunctions [3]. Finally, Cruz-Enríquez et al. used experimental and theoretical methods to show that crystals made from organoboron complexes could exhibit intense photoluminescence, high-contrast photochromic effects, and excellent stability as inks. Their work showed a wonderful combination of experimental and computational work on photoresponsive crystals [4].

Our collection of papers only represents a small portion of the intriguing work being conducted on photoresponsive crystals. I hope that they will be helpful to readers who are interested in recent advances in organic molecular crystals and inspire further research work.

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