ATOMS IN MOTION: CREATING AND CHARACTERIZING DYNAMIC CRYSTALLINE MATERIALS

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Photochromic technologies have the potential to transform traditionally passive materials into active materials which change their chemical or electronic properties in response to light stimulus. New photochromic materials are being synthesized and reported at an extremely rapid rate driven in large part by the numerous potential applications for these advanced materials including molecular switches, sensors, data storage, photomechanical devices and even biological switches.

One of the newest emerging applications for photochromic technologies being developed in the Benedict research lab is the development of photo-responsive crystalline materials capable of undergoing structural reorganization upon application of light. The evolution of strategies for the design and synthesis of diarylethene-based structural building units highlights the challenges of engineering crystals with these conformationally flexible molecules. The Benedict group is also developing cutting edge in situ X-ray diffraction techniques to study the structural reorganization, both photo-induced and through guest exchange, under ‘real world’ conditions in order to develop a molecular level understanding of the processes that occur within these important materials.