Materials Seminar

presented by
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BETWEEN THE SHEETS: THE MOLECULAR CHEMISTRY OF HYBRID PEROVSKITES

The tools of synthetic chemistry allow us to tune molecules with a level of precision not yet accessible with inorganic solids. We have investigated hybrid perovskites that couple organic small molecules with the optical and electronic diversity of extended inorganic solids. I will share our current understanding of these materials, whose technologically relevant properties are highly amenable to synthetic design.
The 3D lead-iodide perovskites have recently been identified as low-cost absorbers for high-efficiency solar cells. Although the efficiencies of devices with perovskite absorbers have risen at an impressive rate, the materials' intrinsic instability and toxicity may impede their commercialization. I will discuss methods developed by our group to address these problems. The 2D hybrid perovskites have dramatically different properties from their 3D congeners. We discovered that some 2D perovskites emit broadband white light (similar to sunlight) when excited by UV light. I will discuss how these materials, which do not contain extrinsic dopants or obvious emissive sites, could emit every color of visible light. Although the organic molecules in hybrid perovskites have mostly played a templating role, we have investigated their role in engendering reactivity. I will describe reactions that occur between the inorganic sheets, which allow these nonporous solids to capture small molecules.

Thursday, May 10
12:15 pm in room 1315 Chemistry