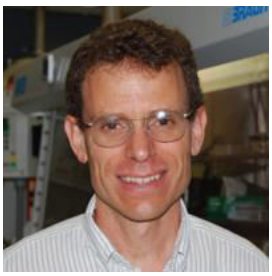
BOSE COLLOQUIUM

14TH DECEMBER, 2017 | 5PM | SILVER JUBILEE HALL



SPEAKER

Professor David B. Mitzi
Department of Mechanical Engineering and Materials Science and
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TITLE

Halide Perovskites: Structural Diversity and Opportunities for Semiconductor Design/Fabrication

ABSTRACT

Although known for more than a century, organic-inorganic hybrid and related inorganic halide-based perovskites have received extraordinary attention recently, because of the unique physical properties of the lead(II)-based systems, which make them outstanding candidates for application in photovoltaic (PV) and related electronic devices. Despite the high levels of device performance, incorporation of the heavy metal lead, coupled with issues of device stability and electrical hysteresis pose challenges for commercializing these exciting technologies. This talk will explore beyond the current focus on three-dimensional (3-D) lead(II) halide perovskites (e.g., $CH_3NH_3PbI_3$), to highlight the great chemical flexibility and outstanding potential (and challenges) of the broader 3-D and lower-dimensional perovskite family. As part of the discussion, the prospects for replacing lead with other metals, the importance of structural dimensionality for determining semiconducting character, along with the promise for both inorganic and organic structural components to play an active role in determining the overall hybrid semiconducting character, will be emphasized. Beyond structural flexibility, as time allows, the talk will further discuss how chemical flexibility leads to an unusually large range of processing options for preparing high-performance perovskite films. Outstanding functionality combined with versatile/facile processing provide two pillars for future application of this materials family. Yoon, S. J.; Kuno, M.; Kamat, P. V. Shift Happens. How Halide Ion Defects Influence Photoinduced Segregation in Mixed Halide Perovskites. ACS Energy Lett. 2017, 1507-1514.