



MATERIALS SCIENCE & ENGINEERING DISTINGUISHED SEMINAR SERIES



Dr. Michael Chabinyc

Professor
Chair

Materials Department
University of California
Santa Barbara, CA

Friday

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11:00AM — 12:00PM

Zoom

[Meeting Room](#)

Contact: Dr. Tengfei Jiang

Materials Science & Engineering

Phone: 407-823-2284

Email: Tengfei.Jiang@ucf.edu

Layering Organic Metal Halide Semiconductors

Hybrid organic metal halides, such as $\text{CH}_3\text{NH}_3\text{PbI}_3$, have garnered significant attention because they are earth-abundant, solution-processable materials that can be used to form solar cells with high power conversion efficiency (>20%). Despite their impressive performance in lab-based devices, there are significant questions about the phase behavior of these materials and their resulting properties. We will present our work on understanding the electronic properties of 3D and 2D Pb- and Bi-based systems. An interesting feature of hybrid organic metal halides is the ability to form layered Ruddlesden-Popper phases with quantum confinement by judicious choice of mixed organic cations. Controlling the phase behavior during growth of thin films of R-P compounds is particularly challenging. Despite the structural disorder apparent from quantitative analysis of grazing incidence X-ray scattering and electron microscopy, these materials surprisingly still have sharp band edges. Routes to control the phase purity of these materials during growth from solution will be presented that enable control of their optoelectronic properties.

Biography: Professor Michael Chabinyc is Chair of the Materials Department at the University of California Santa Barbara. He received his Ph.D. in chemistry from Stanford University and was an NIH postdoctoral fellow at Harvard University. He was a Member of Research Staff at (Xerox) PARC prior to joining UCSB in 2008. His research group studies fundamental properties of organic semiconducting materials and thin film inorganic semiconductors with a focus on materials useful for energy conversion. He has authored more than 200 papers across a range of topics and is inventor on more than 45 patents in the area of thin film electronics. He is a fellow of the Materials Research Society, the American Physical Society, the American Association for the Advancement of Science, and the National Academy of Inventors.