DREXEL UNIVERSITY
Materials Science and Engineering
College of Engineering

Enhancing Lead Halide Perovskite Stability for Optoelectronic Applications

PhD Candidacy Exam

April 9, 2020, 10:00AM – 12:00PM

Online - Zoom Link: https://drexel.zoom.us/j/747576450

Meeting ID: 747 576 450

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Abstract

Lead halide perovskite is a new class of semiconducting materials that have attracted much research interest for their potential optoelectronic applications due to its unparalleled photoluminescent intensity—a result of its near 100% photoluminescent quantum yield and its unusually high light-absorbing capability. Intense research activities on these materials since its discovery a few years ago have yielded drastic increases both in power conversion efficiency for solar cells and in external quantum efficiencies for light emitting diodes (LEDs). While these performances were exciting the lack of ambient stability of the perovskite materials greatly diminishes their potential for commercial development. This is because they can lose their electrooptical properties rapidly when exposed to moisture due to their high reactivity with water. Besides water, they are also sensitive to light, heat, and oxygen. A significant amount of research has been dedicated to improving their ambient stability. In this presentation, strategies such as compositional engineering and encapsulation that have been utilized to improve the stability will be reviewed from which future directions will be discussed.