NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Physical and Mathematical Sciences
College of Science

ORAL DEFENCE ANNOUNCEMENT

KRISHNAMOORTHY THIRUMAL

Low-dimensional Metal Halide Perovskite Phosphors for Solid State Lighting

Exciton-phonon coupling is known to occur in ionic crystals and also in semiconductors and its presence is also known to affect the charge carrier transport. However, the effects of exciton-phonon coupling on the photophysical properties of materials, particularly metal halide perovskites, are relatively less explored. In this thesis, exciton-phonon coupling was used to attain broadband emissions from the organic-inorganic metal halide hybrid perovskites. This was achieved by reducing the dimensionality of the perovskites that allowed easy deformation of metal halide octahedra. In the case of semiconducting two dimensional perovskite, lattice deformation led to exciton-phonon coupling, which resulted in the formation of self-trapped exciton. Instead, in the molecular zero-dimensional perovskites, structural deformation of metal halide octahedra resulted in the stabilization of excited state of the metal halide molecular octahedral complexes. Both semiconducting and molecular perovskites exhibited broadband emissions. Finally, structure-property correlations of these perovskites were established to some extent..

Date: 16 Jan 2020
Time: 9.00 AM
Venue: Meeting Room, Research & Graduate Studies Office, Level 2, SPMS
Supervisor: Prof Subodh Mhaisalkar