清华大学航天航空学院工程热物理研究所
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Unusual thermal transport behaviors in superstructured hybrid materials

主 讲 人：**Wee-Liat Ong**

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||摘要：

Superstructured hybrid materials self-assemble from solutions and are scalable replacements for single crystal semiconductors for many technologies. Although their electrical, electronics, and optoelectronics properties have been investigated, thermal properties of these materials remain relatively unchartered. This inhibits technological adoption where thermal management is requisite to prevent performance and lifetime degradation. In this talk, I will focus on thermal transport in two hybrid material systems – nanocrystal arrays (NCAs) and superatom crystals (SACs). NCAs are organized arrays of ligand-stabilized colloidal nanocrystals with size-tunable electronic and optical structure. SACs are periodic self-assemblies of superatoms which are clusters of atoms that behave as a unit with emergent properties distinct from their elemental atoms. In my presentation, I will explain the mechanisms of thermal transport in these three-dimensional organic-inorganic superstructured materials. I have used the frequency domain thermoreflectance technique to measure the thermal conductivity in NCA thin films and nanoliter-sized SAC single crystals. Complementing these experiments, I employed molecular dynamics simulations, lattice dynamics calculations, and density functional theory calculations to interpret the measurements and explore experimentally-inaccessible nanoscale phenomena.

||报告人简介：

Wee-Liat graduated with a BEng in Mechanical Engineering from the National University of Singapore (NUS) and was the valedictorian of his class as well as the recipient of the IES gold medal and Lee Kuan Yew gold medal in 2002. He joined the Institute of Microelectronics, Singapore and worked in the fields of bioMEMS and microfluidics. In 2015 he received his PhD in Mechanical Engineering at Carnegie Mellon University under Prof. Jonathan Malen and Prof. Alan McGaughey. Before coming to Zhejiang University, he is a joint post-doctoral fellow at Columbia University and Carnegie Mellon University.