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Understanding energy and mass transport in designer nanocrystal-polymer hybrids

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Abstract

The interface between hard and soft condensed matter presents new and compelling research opportunities in the transport of energy and mass due to the dramatic contrasts in bonding energy, chemical interactions, and transport modalities between these constituents. Here, I will discuss my group's research efforts at designing, characterizing, and modeling the transport properties of nanocrystal-polymer hybrid systems, which I have developed as platforms for understanding the critical role that interfaces can play in dictating transport properties. Specifically, this talk will encompass two thematic areas in this space. I will first discuss energy transport in the context of thermoelectrics for Te nanorod-PEDOT: PSS polymer hybrid materials, and gas transport and storage in Mg nanocrystal: PMMA polymer hybrid materials.