The Role of Interparticle Ordering in the Conductivity of Thin Films of Lead Sulfide Nanoparticles

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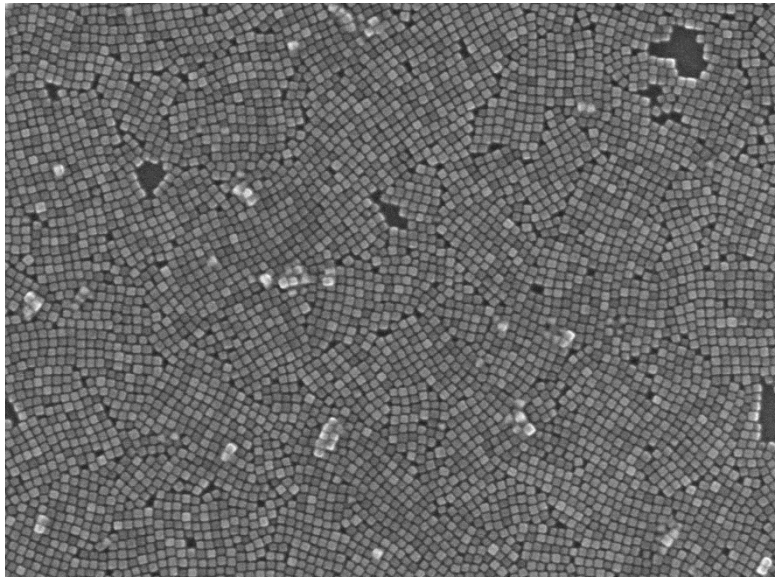
Lead sulfide is a cheap, earth-abundant material that produces stable colloidal nanocrystals that absorb and emit in the near-infrared. It has a cubic lattice structure such that, when grown to ~10 nm in diameter, the particles assume a cubic shape. This shape enables the formation of locally ordered assemblies with interparticle distances and electrical conductivities dictated by the passivating ligands, which can be exchanged depending on the application. We are exploring the mechanisms by which the shape, order, and interparticle chemistry dictates conductivity in these arrays.



Scanning electron microscopy image of a quasi-ordered monolayer of lead sulfide nanocubes (with diameter ~10 nm), deposited on Si/SiO_2.

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