Controlled Synthesis of Colloidal Nanocrystal Quantum Dots

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Inorganic nanomaterials (e.g., colloidal quantum dots) exhibit unique properties, which cannot be obtained by conventional bulk materials. The properties of nanomaterials heavily depend on their structures. However, the formation mechanism of colloidal nanocrystals has not been fully understood, yet. In this presentation, I will present my research on studying formation pathways of colloidal nanocrystals. First, I will talk about extremely small-sized semiconductor nanoclusters, which are important missing links between atoms and nanocrystals. Second, I will introduce in-situ liquid-phase transmission electron microscopy (TEM) techniques for studying colloidal nanocrystal formation. Furthermore, I will briefly discuss how the structure of nanocrystals is related to thier applications (solar energy conversion, light-emitting diodes, etc.).