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【163】 Shape Transformation of Nanocrystals investigated by Model Free X-Ray Scattering Analyses

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Chemical synthesis of colloidal nanocrystals (NCs) can produce particles with controlled sizes and complex shapes, which influence their physical properties. For controlling the NCs' morphology, the 3D shape analysis of NCs is a key issue. Small angle X-ray scattering (SAXS) is a leading technique for analyzing NCs in sub-nanometer resolution. From SAXS data the 3D mean shape can be retrieved using model-free techniques. In this study the varying morphology during growth of iron oxide nanocrystals is analyzed. The FeO NCs transform from nanostars to nearly perfect nanocubes. X-ray diffraction experiments link the derived NC-shape to crystallographic directions. The congruence of the results is demonstrated by comparison to TEM analysis.

Theoretical Work

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