

Investigation of the Disordered Layer in Stannite Nanocrystals Through a Magnetic Phase Analysis

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We investigated the local disordered layer in stannite nanocrystals by using a magnetic phase analysis and Mössbauer spectroscopy. Stannite nanocrystals were synthesized by using high-temperature to prevent precipitation in a coordinating solvent, oleylamine, at reaction temperatures of 230, 280, and 330 °C to induce local changes in crystallization. Magnetic susceptibility measurements revealed that antiferromagnetic ordering became weaker as the reaction temperatures were decreased. These results indicate the presence of Fe^{3+} clusters originating from the emergence of a disordered Cu+Fe layer at low reaction temperatures, and this disordered Cu+Fe layer induced the change observed in the band-gap energy of the stannite nanocrystals.

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