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Synthesis and structural analysis of γ–Fe2O3/CdS nanocrystal heterodimers KWAN-WOOK KWON, MOONSUB SHIM, University of Illinois at Urbana-Champaign, UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN TEAM — Inorganic nanocrystal oligomers with two or more distinct chemical compositions open up interesting avenues of developing building block materials for a variety of research directions. For example, asymmetric dimers, trimers, etc. can provide chemically programmable assembly of nanostructures. Unique properties arising at the nanoscale may also be juxtaposed in a controlled manner (e.g. ferromagnetic behavior with optical properties governed by quantum confinement). γ–Fe_2O_3/CdS heterodimers have been synthesized in solution by annealing Cd and S reagents adsorbed on γ–Fe_2O_3 nanocrystals. While the large lattice mismatch between γ–Fe_2O_3 and CdS leads to dewetting, TEM analysis reveals that certain junction planes can lead to minimized strain allowing dimers to form. Furthermore, both wurtzite and zinc blend structures are observed to grow on the close-packed (1 1 1) plane of γ–Fe_2O_3.

Kwan-Wook Kwon
University of Illinois at Urbana-Champaign

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