Abstract Submitted
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Preparation of monodisperse silicon nanocrystals through density-gradient unltracentrifugation in organic solvents[1] JOSEPH B. MILLER, AUSTIN VAN SICKLE, SWATHI IYER, NDSU, REBECCA A. ANTHONY, UWE R. KORTSHAGEN, University of Minnesota, ERIK K. HOBBIE, NDSU — Monodisperse colloidal suspensions of ligand-coated silicon nanocrystals, synthesized through a nonthermal low-pressure plasma reaction, have been prepared through density-gradient ultracentrifugation in mixed organic solvents. Density-gradient profiles of mixed chloroform and m-xylene are used to tune and control the settling speed of the nanoparticles and hence optimize their transient separation by size along the depth of polyoxymethylene ultracentrifuge tubes. The mean size and polydispersity of the extracted fractions are characterized through photoluminescence spectroscopy and transmission electron microscopy, and the self-assembly of fractions into close-packed crystal lattices is achieved using an immiscible two-fluid evaporation scheme. The photophysical properties of the nanocrystal lattices are compared with those of the starting materials and suspensions, and the influence of atmospheric oxygen on the stability of the nanocrystal photoluminescence is measured.

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