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Characterization and Optical Tuning of CdSe & ZnS Quantum Dots Generated by Laser Ablation of Microparticles[1] IGNACIO GALLARDO, KAY HOFFMANN, JOHN KETO, The University of Texas at Austin — CdSe and ZnS core-shell nanoparticles made by LAM (Laser Ablation of Microparticles) show photoluminesence (PL) peaks in a region of wavelengths below 400nm. Control over the size and PL peak position is obtained by irradiating the nanoparticles multiple times. In LAM, micropaticle powder passes through an aerosol generator and then into a laser ablation glass cell, where a laser pulse (high energy excimer laser) ablates the microparticle aerosol. Nanoparticles are formed after condensation. At this stage the nanoparticles can be covered with a second material or irradiated multiple times to change their size. Using TEM (Transmission Electron Microscopy) measurements, CdSe particles have shown a size range that goes from 3.1±0.17nm (one ablation) to a mean radius of 2.5±0.19nm (after a second radiation). PL blue shifts are seen as the mean size decreases. A thermodynamic numerical calculation based on evaporation models and Mie absorption during the LAM process supports the blue shifting of the PL peaks by showing a decrease in particle size as they are exposed to multiple laser irradiations.

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