Supporting Information

Ultra-Small Photoluminescent Silicon-Carbide Nanocrystals by Atmospheric-Pressure Plasmas


Figure S1: Photograph of the experimental set-up
Figure S2: (a-c) Selected area electron diffraction patterns of SiC nanocrystals for the three different synthesis conditions corresponding to the three different average diameters; displayed also the corresponding plane assigned. (d) Summary of lattice spacing (in nm) determined from diffraction patterns compared to spacing of bulk 3C-SiC; the main planes (111) and (200) are clearly identified for all samples whereby deviations from bulk values are to be expected due to the size of the NCs.
Figure S3: Deconvolution of the photoluminescence emission intensity at various excitation wavelengths (220 nm to 280 nm) for the samples exhibiting mean diameters of 1.5 nm, 3.7 nm and 5.2 nm. Deconvolution was carried out using Gaussian functions with Fityk 0.9.8 and used peaks at 306.8 nm, 323.5 nm, 335.0 nm, 356.8 nm and 409 nm (see discussion in the main manuscript).
Figure S4: typical emission spectrum of the plasma. The plasma conditions represent those used for the synthesis of SiC nanocrystals (NCs) with 2.4 sccm tetramethylsilane (TMS) flow. The light from the plasma is collected through a fiber optic placed axially end-on, downstream of the reactor. The fiber optic is then connected to a spectrograph (Sharmok 3030i) equipped with two different gratings of 1200 grooves/mm and 150 grooves/mm and a charged coupled device (CCD) detector (Andor iStar). Several lines originated from atomic Si can be observed in the wavelength range 200-300 nm.