Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C

Photochemical Reaction of Vitamin C with Silicon Nanocrystals: Polymerization, Hydrolysis and Photoluminescence

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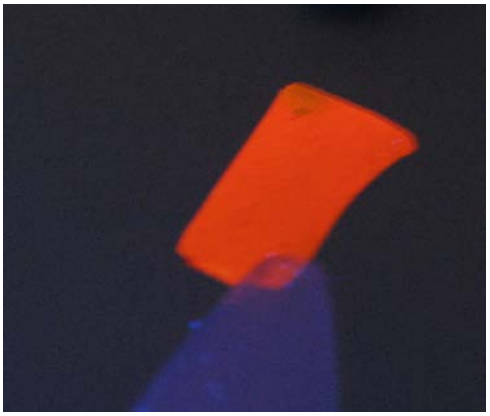

Figure S1. Photograph of stain etching-derived porous silicon under 365 nm excitation from a hand-held lamp.

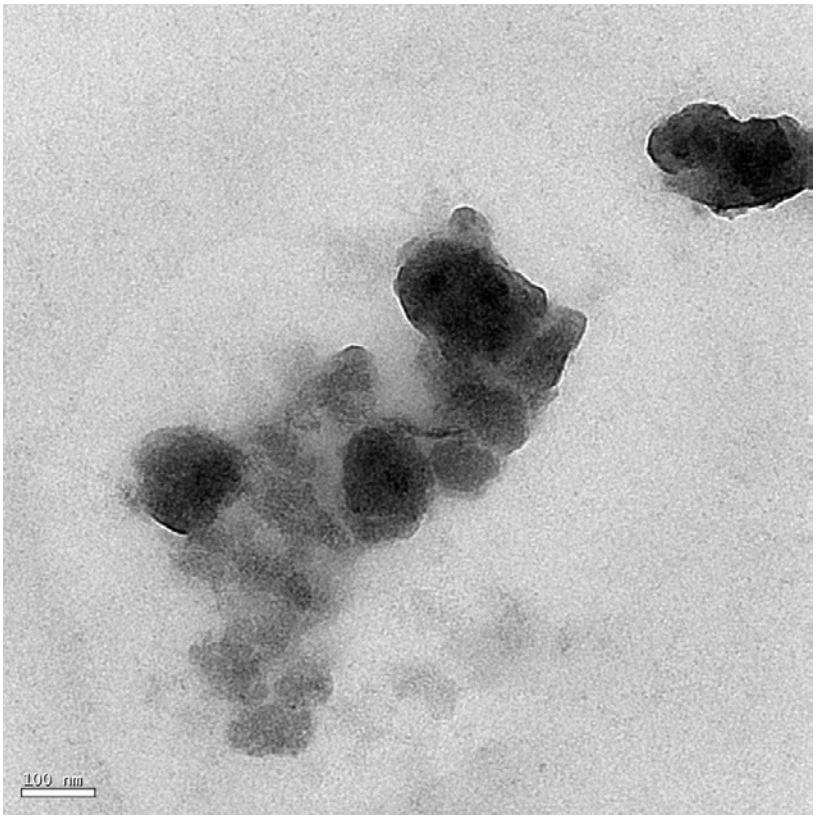

Figure S2. TEM image of large-sized H-SiNCs cast from toluene dispersion.

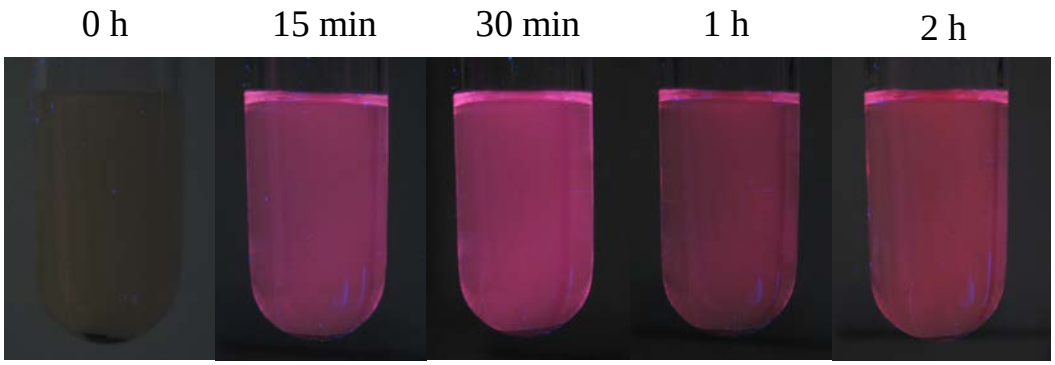

Figure S3. Photographs showing the photoluminescence of an ethanolic solution of fractured porous silicon after 3 h ultrasonication in neat ethanol and subsequent 254 nm irradiation for different time intervals. The photographs were taken under 365 nm excitation from a hand-held lamp.

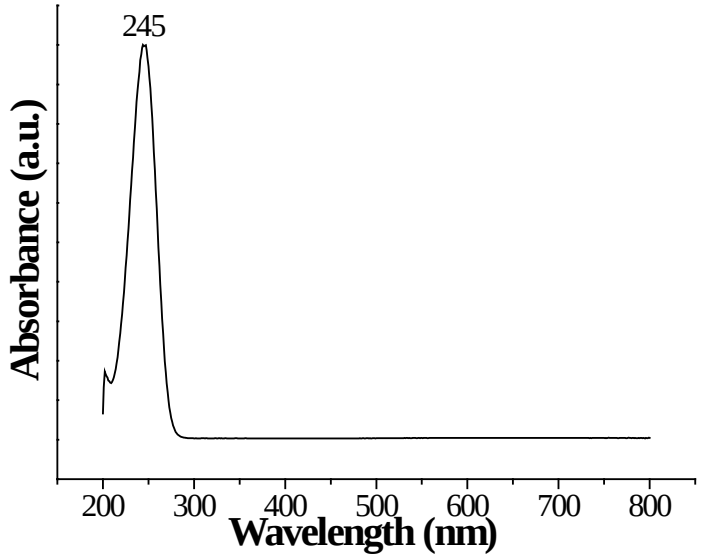

Figure S4. Absorption spectrum of vitamin C in ethanol. The sharp peak at 245 nm arises from π→π* transition of carbon-carbon double bond present in the five-membered lactone ring structure of vitamin C.

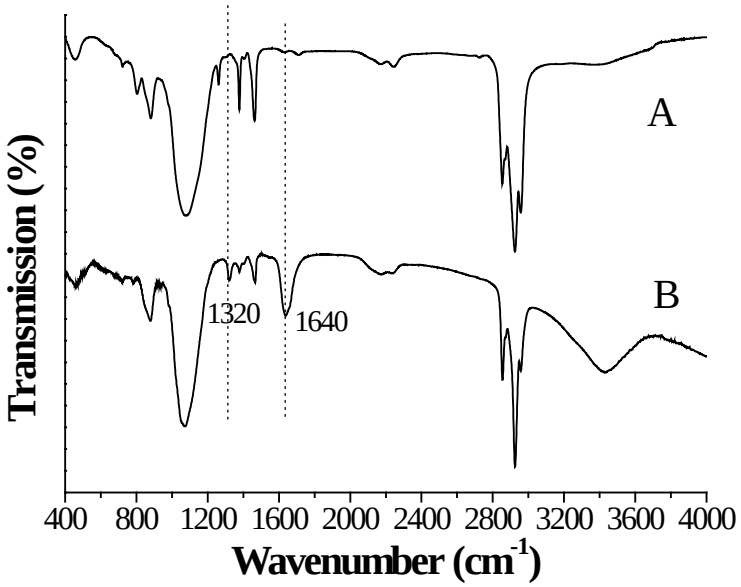

Figure S5. FTIR spectra of 1-decene-modified SiNCs before and after irradiation at 254 nm in the presence of VC. The additional absorption bands at 1640 and 1320 cm^{-1} indicate polymer formation from VC.

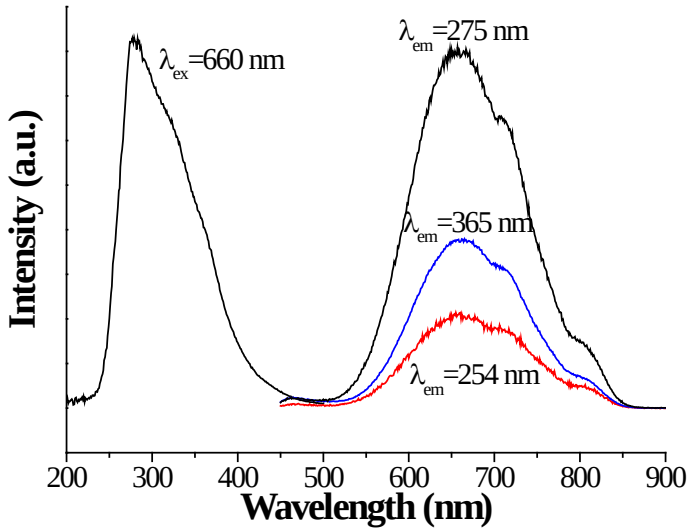

Figure S6. Excitation and emission spectra of supernatant collected by centrifugation of fractured porous silicon and VC ethanol solution under 254 nm irradiation for 2 h. The excitation and emission wavelengths were indicated in the spectra. The emission spectra were recorded with excitation of 254, 365 and 275 nm; the excitation spectra were recorded at emission of 660 nm.

Fluorescence and excitation spectra were recorded on a Hitachi F-4600 spectrophotometer equipped with a 150 W Xe-arc lamp and a 450 nm cutoff filter at room temperature. For comparison, the emission spectra of the sample were measured at a fixed band pass of 0.2 nm with the same instrument parameters (2.5 nm for excitation split, 2.5 nm for emission split and 700 V for PMT voltage).