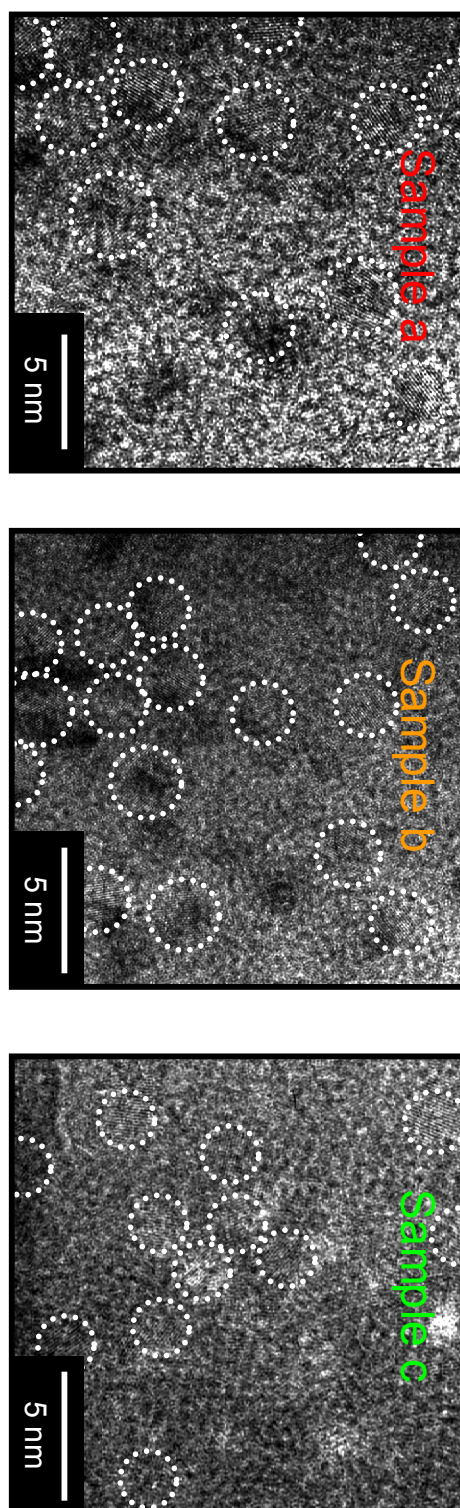


Supplementary information

Figure S1



5 **Figure S1** Large-scale TEM images of the Si-nc (Samples a, b, and c).

Figure S2

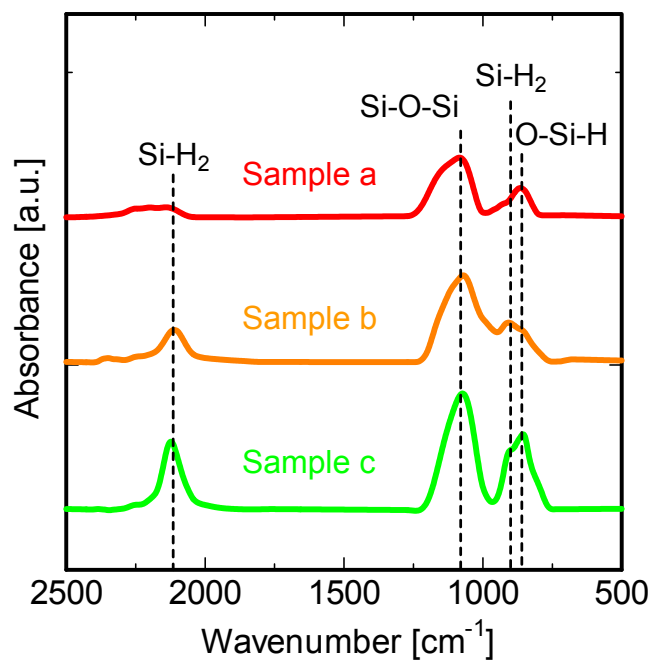


Figure S2 IR spectra of Si-nc (Samples a, b, and c). [2100 cm⁻¹: Stretching vibrational mode of Si-H₂, 1080 cm⁻¹: Asymmetric stretching vibrational mode of Si-O-Si, 900 cm⁻¹: Scissors vibrational mode of Si-H₂, and 880 cm⁻¹: O-Si-H mode]

Figure S3

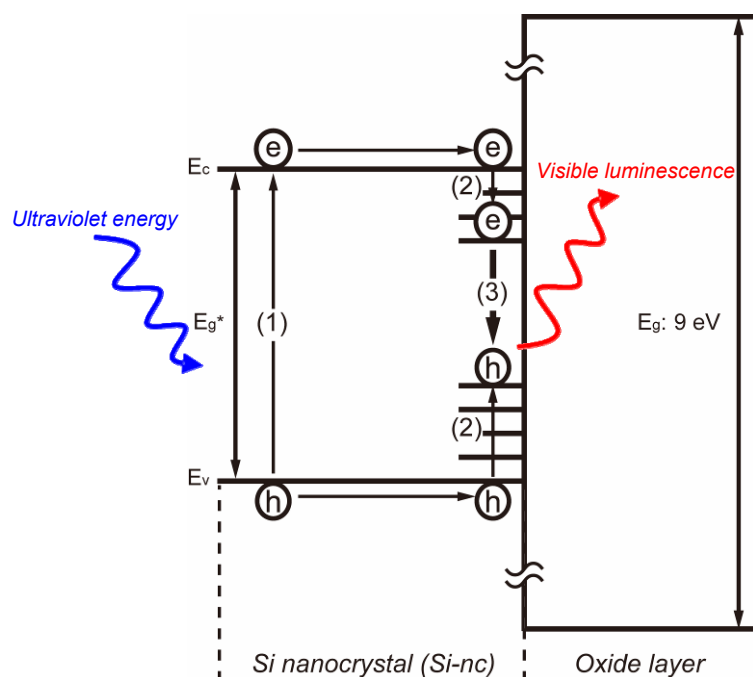


Figure S3 Luminescent mechanism. The luminescence phenomenon is caused by the radiative recombination of an electron and a hole after UV irradiation. [E_c : Conduction band edge, E_v : Valence band edge, E_g^* : Optical bandgap energy of Si-nc, E_g : Bandgap energy of SiO_2 , e: Electron, h: Hole]