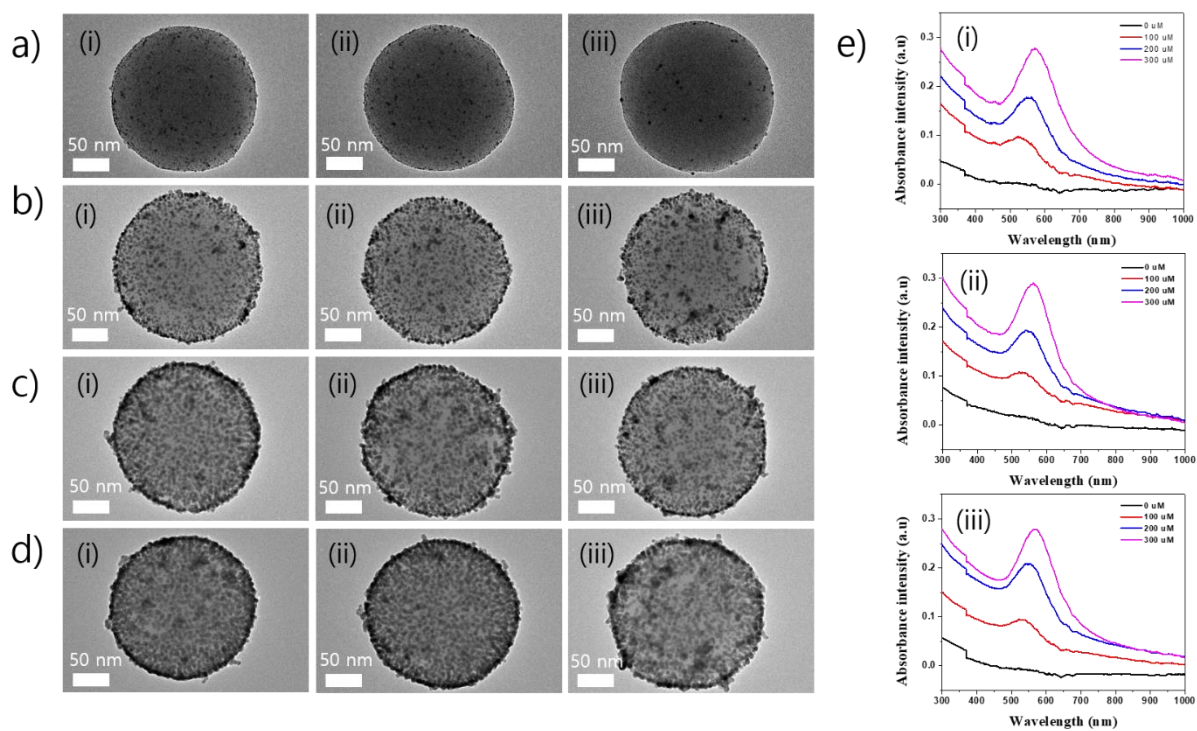


# Synthesis of Densely Immobilized Gold-assembled Silica Nanostructures



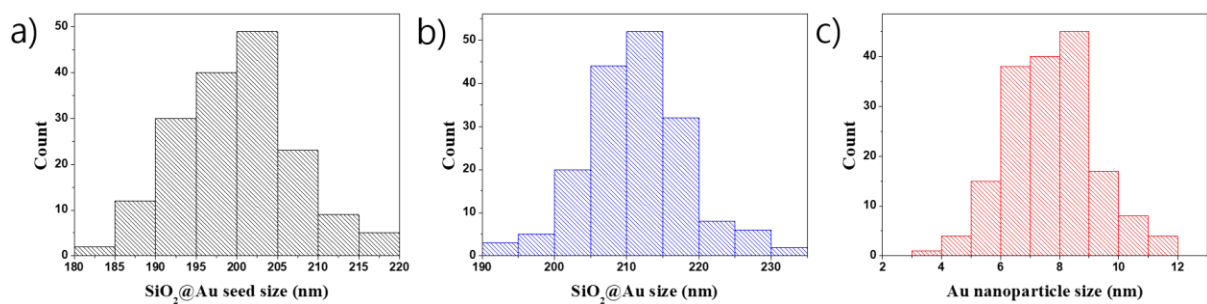


Figure S2. Histogram of nanoparticle size: (a) SiO<sub>2</sub>@Au seed (n = 170), (b) SiO<sub>2</sub>@Au synthesized at 150  $\mu\text{M}$  Au<sup>3+</sup> (n = 172) and (c) HF treated-SiO<sub>2</sub>@Au (n = 172).

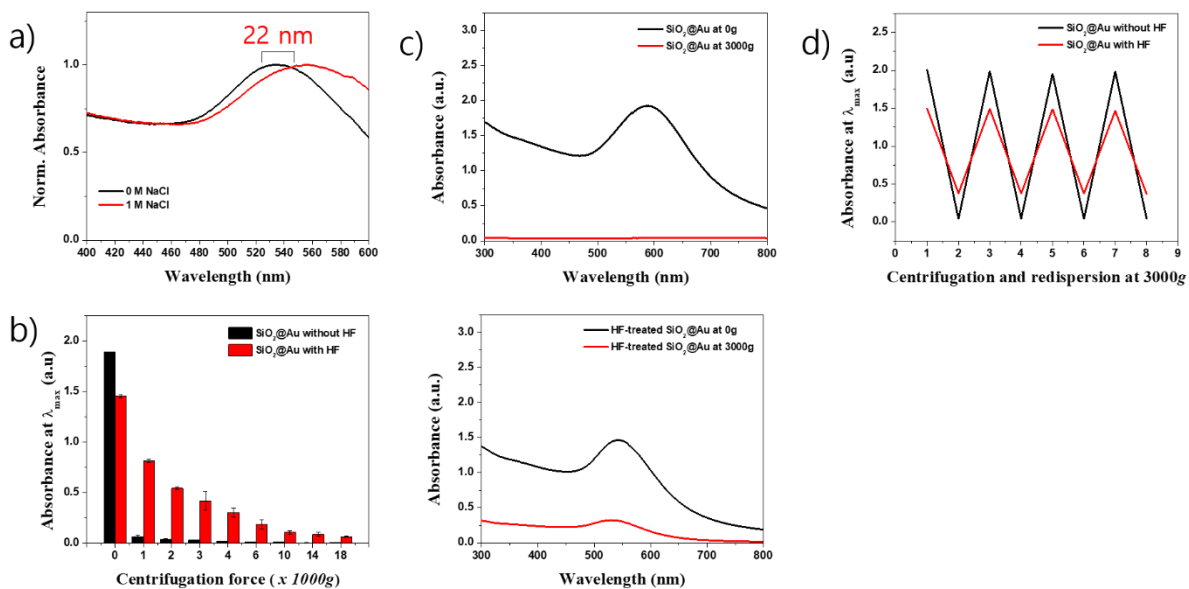


Figure S3. a) Red-shifting of UV-Vis spectra of SiO<sub>2</sub>@Au treated HF, (b) effect of centrifugation speed, (c) UV-Vis spectra of SiO<sub>2</sub>@Au and HF-treated SiO<sub>2</sub>@Au, (d) optical absorbance plot of SiO<sub>2</sub>@Au nanostructures synthesized at 150 mM Au<sup>3+</sup> with and without HF treatment after centrifugation (2, 4, 6, 8 in x-axis) and redispersion (3, 5, 7 in x-axis).

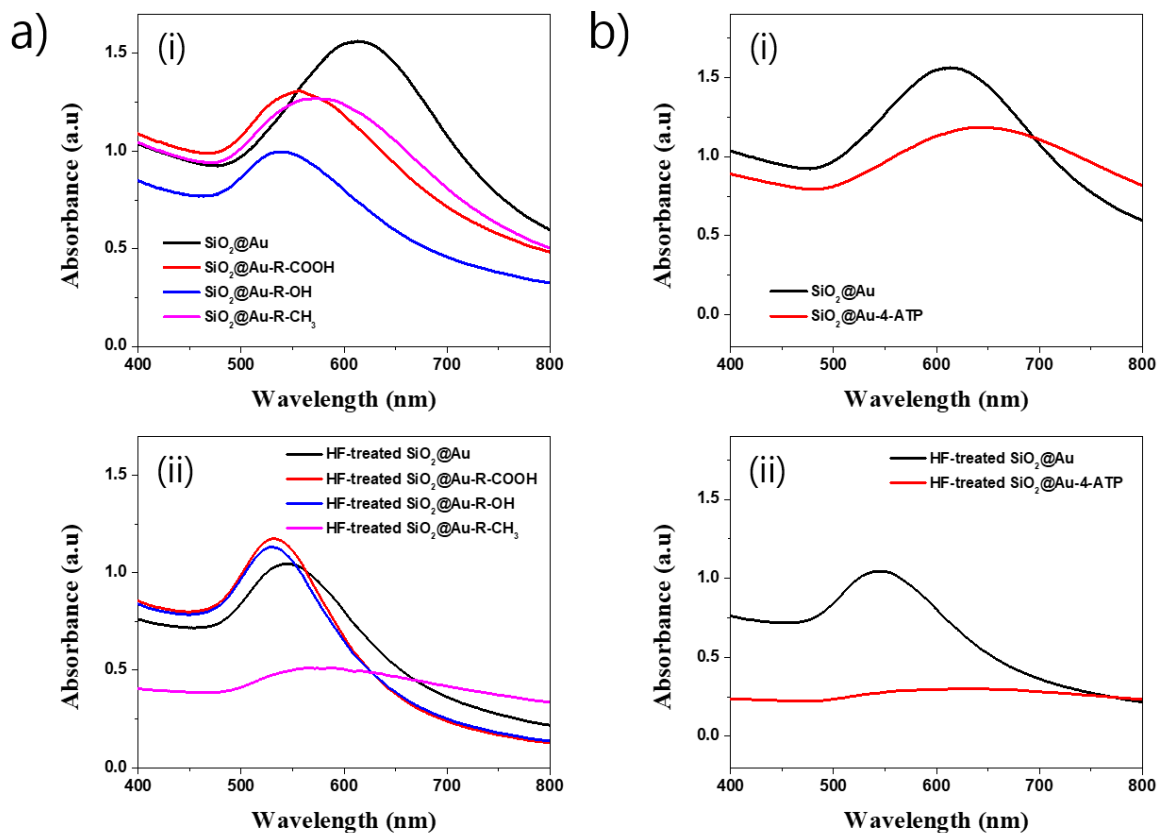


Figure S4. Effect of surface modification of (a) 1-undecanethiol (R-CH<sub>3</sub>), 11-mercaptopundecanoic acid (R-COOH) and 11-mercapto-1-undecanol (R-OH) ligands and (b) 4-ATP on the UV-Vis spectra of (i) SiO<sub>2</sub>@Au nanostructures and HF-treated SiO<sub>2</sub>@Au synthesized at 150 mM Au<sup>3+</sup>.

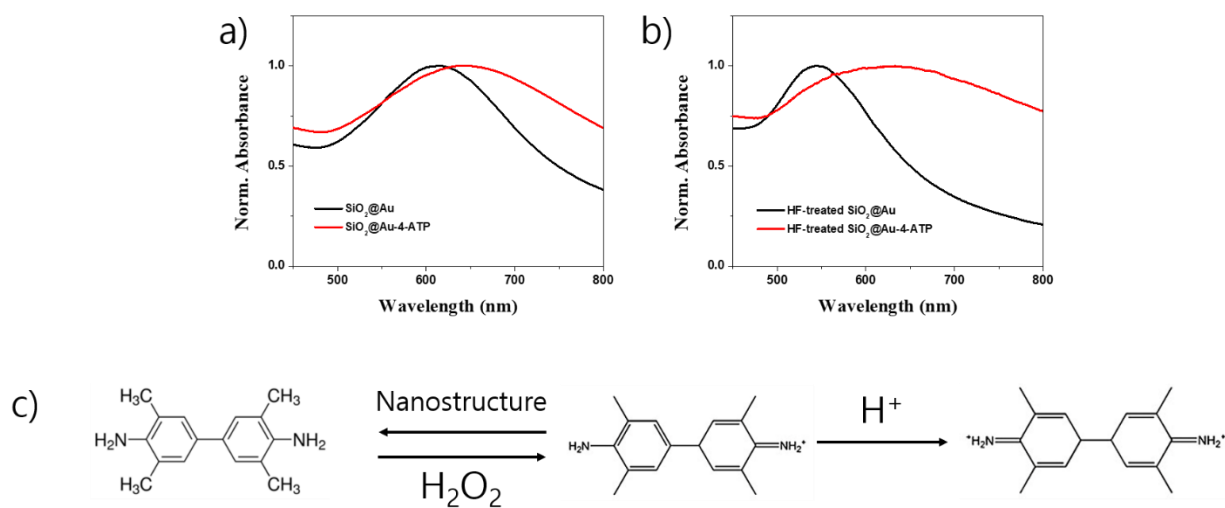


Figure S5. Normalized absorbance spectra of (a) SiO<sub>2</sub>@Au nanostructures and (b) HF-treated SiO<sub>2</sub>@Au synthesized at 150 mM Au<sup>3+</sup>. (c) Mechanism of peroxidase-like catalytic activity of SiO<sub>2</sub>@Au nanostructures.