

Synthesis of Finely Controllable Sizes of Au Nanoparticles on a Silica Template and Their Nanozyme Properties

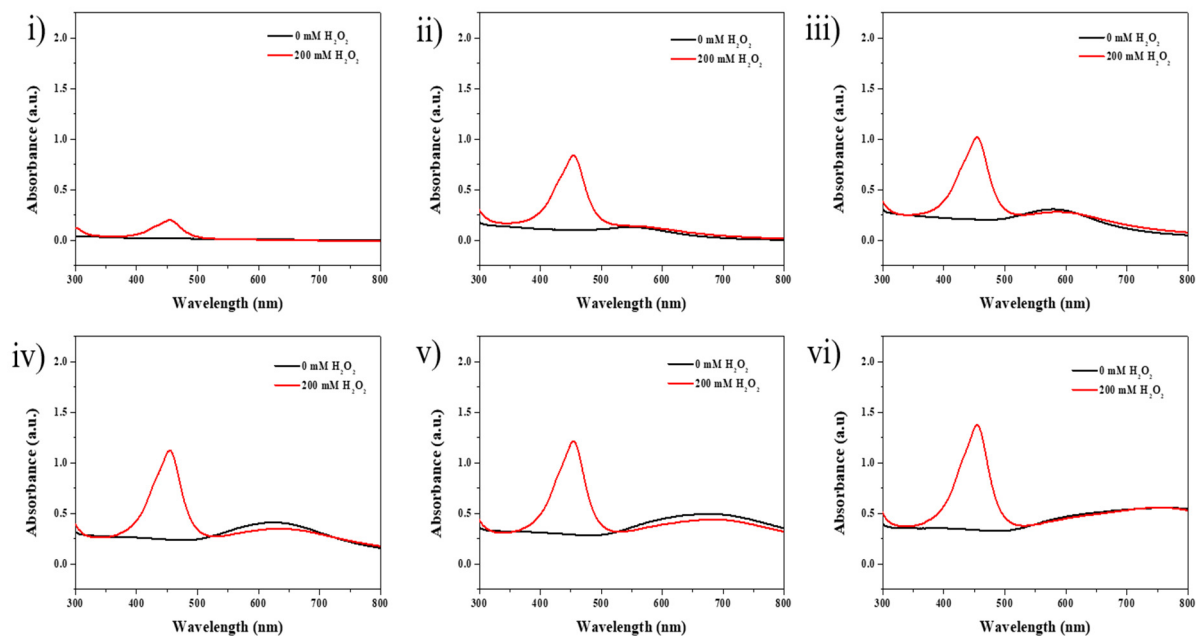


Figure S1. UV-Vis spectra of 0.1 mM TMB and 200 mM H_2O_2 in the presence of various $\text{SiO}_2\text{@Au}$ NPs fabricated at (i) 0 μM , (ii) 50 μM , (iii) 100 μM , (iv) 150 μM , (v) 200 μM , and (vi) 300 μM of Au^{3+} concentration.

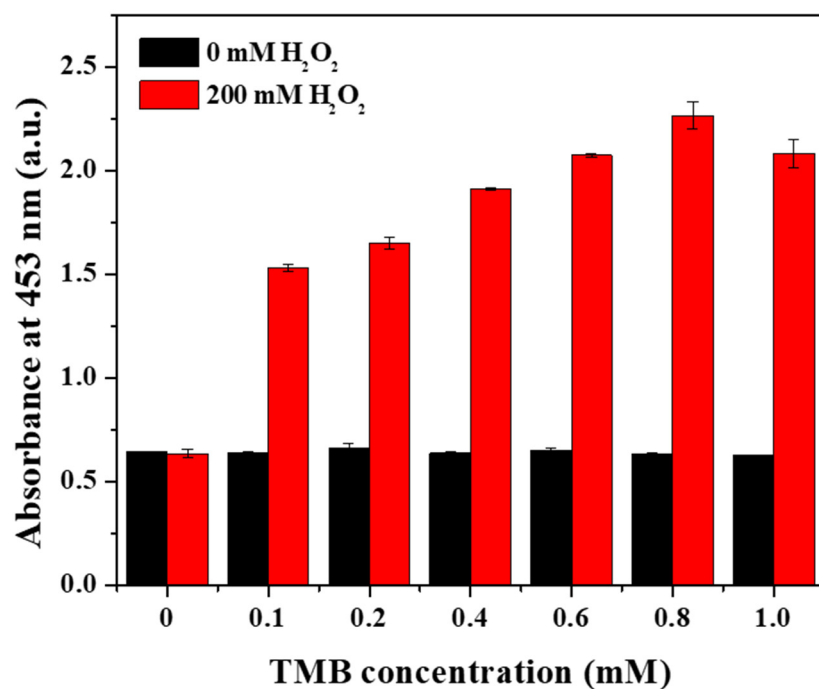


Figure S2. The effects of TMB concentration in the range of 0 to 1.0 mM on the peroxidase-like activity of $\text{SiO}_2@\text{Au}$ in mixture of TMB and 200 mM H_2O_2 : The UV-Vis absorbance plots of each condition at 453 nm wavelength which is absorbance of oxidated TMB substrate.

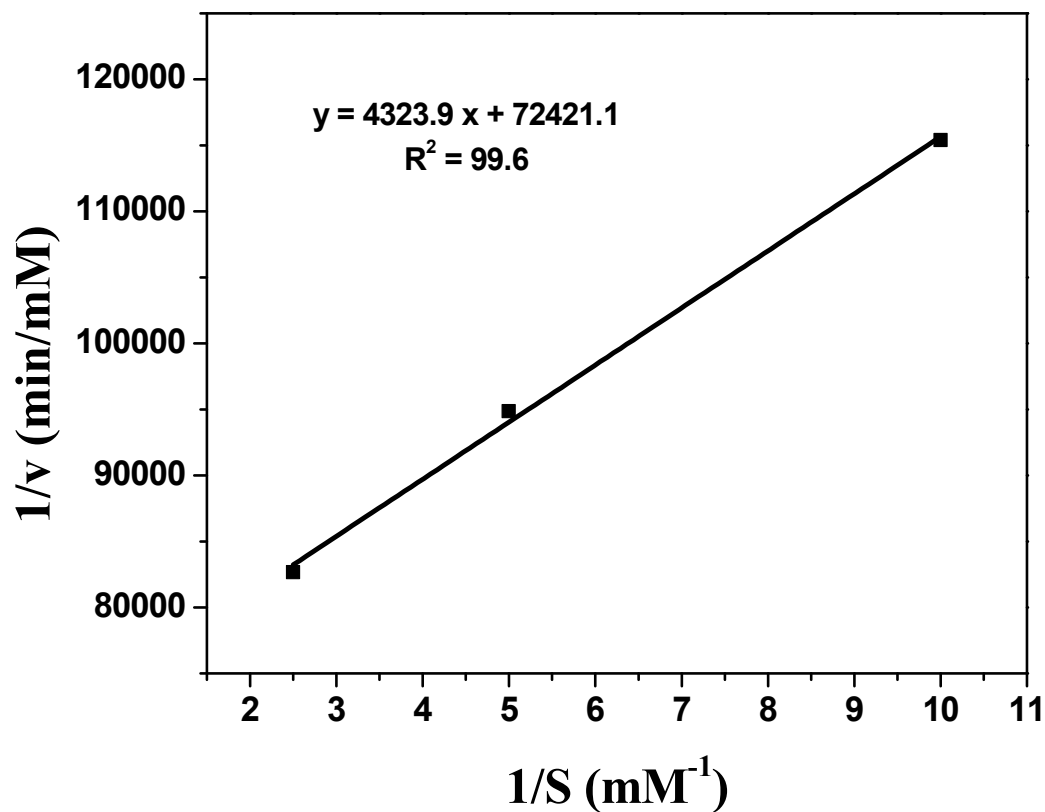


Figure S3. Kinetic analysis of SiO₂@Au. Kinetic parameters of SiO₂@Au were determined by using various TMB concentrations of 0.1-0.4 mM. The value of Michaelis constant K_m and maximal velocity of the reaction V_{max} is attained according to the Lineweaver-Burk equation ($1/v = K_m/(V_{max}*[S]) + 1/V_{max}$).

$$V_{max} = 2.3 \times 10^{-10} \text{ M.s}^{-1}$$

$$K_m = 0.0597 \text{ mM}$$

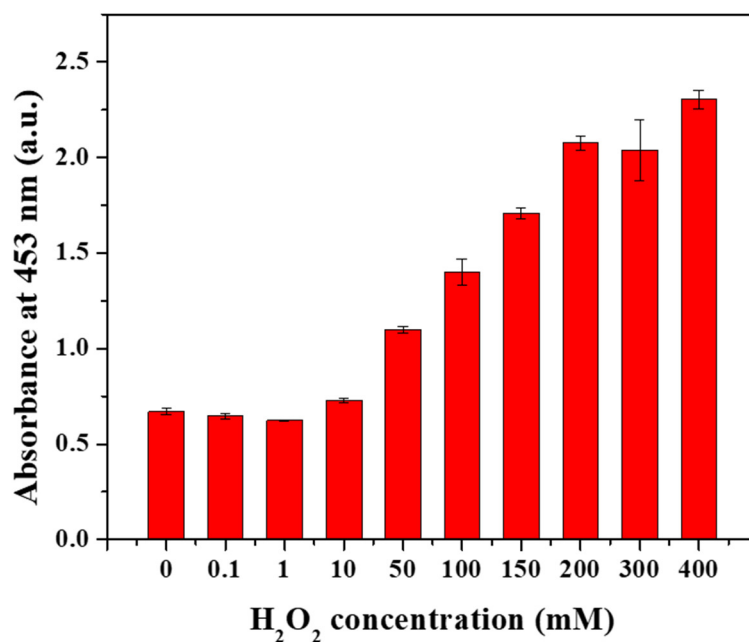


Figure S4. The effects of H_2O_2 concentration in the range of 0.1 to 400 mM on the peroxidase-like activity of $\text{SiO}_2@\text{Au}$ in mixture of 0.6 mM TMB and H_2O_2 . The UV-Vis absorbance plots of each condition at 453 nm wavelength which is absorbance of oxidated TMB substrate.

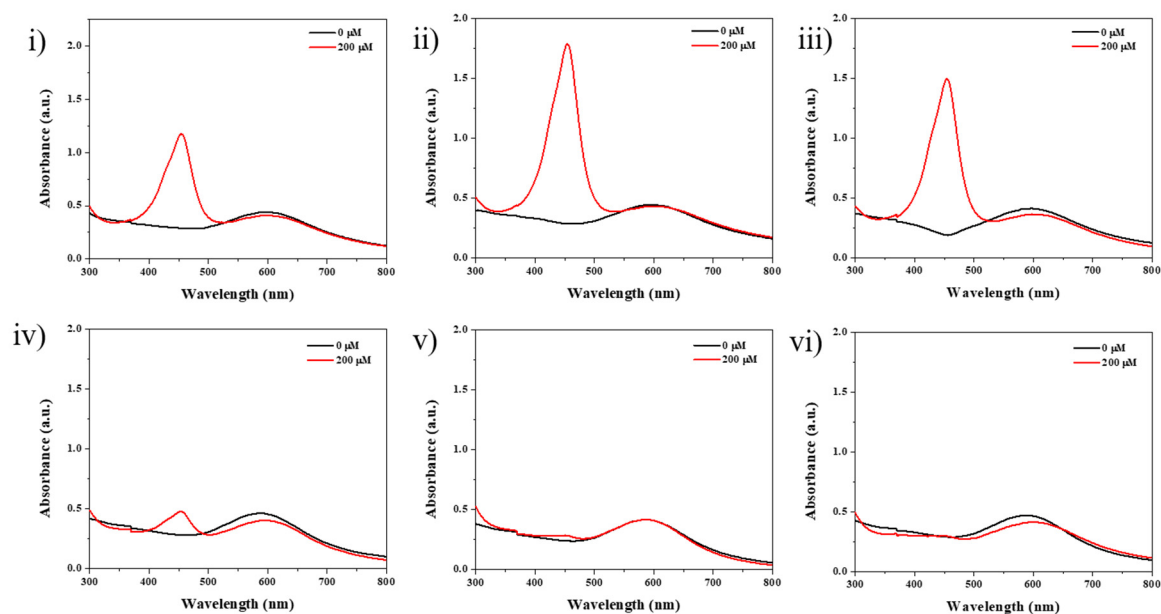


Figure S5. Effect of pH solution on the UV-Vis spectra of 0.6 mM TMB and 200 mM H_2O_2 in the presence of $\text{SiO}_2@\text{Au}$ at various pH conditions: (i) pH 3.0, (ii) pH 4.0, (iii) pH 5.0, (iv) pH 6.0, (v) pH 7.0, and (vi) pH 8.0.

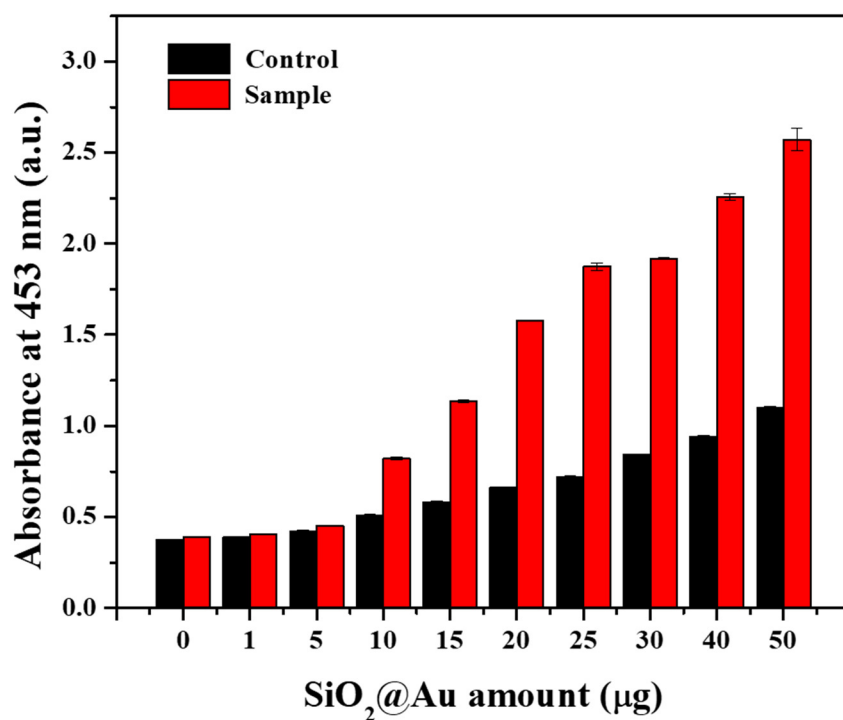


Figure S6. The effects of SiO₂@Au amount in the range of 0 to 50 μg on the peroxidase-like activity of SiO₂@Au in mixture of 0.6 mM TMB and H₂O₂. The UV-Vis absorbance plots of each condition at 453 nm wavelength which is absorbance of oxidated TMB substrate.

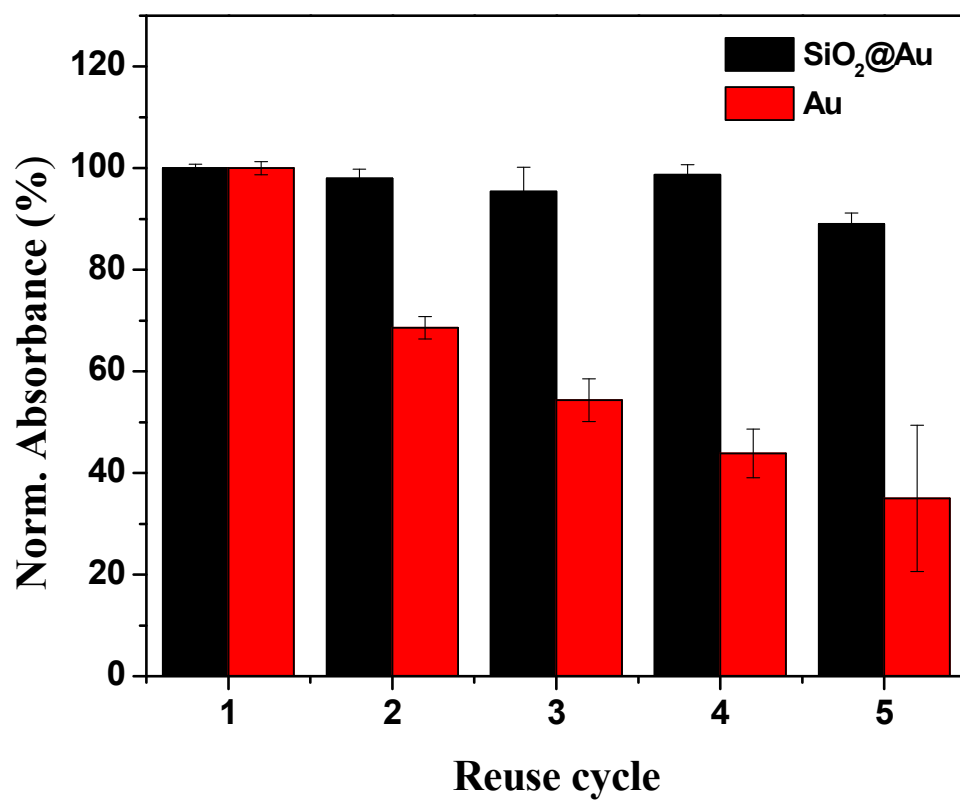


Figure S7. Reusability of SiO₂@Au and Au NPs in a mixture of 0.6 mM TMB, 200 mM H₂O₂, and pH 4 buffer. The SiO₂@Au and Au NPs were stored in PBST (0.1%) at room temperature.