Electronic Supplementary Material (ESI) for RSC Advances.
This journal is © The Royal Society of Chemistry 2019

Supplementary Information

One-pot one-step synthesis of Au@SiO_2 core-shell nanoparticles and their shell-thickness-dependent fluorescent properties

Shan Zhang, Xiaochuan Xu, Guoyu Zhang, Bin Liu and Jianhui Yang*

Key Laboratory of Synthetic and Natural Functional Molecule Chemistry of Ministry of Education, Shaanxi Key Laboratory of Physico-Inorganic Chemistry, College of Chemistry & Materials Science, Northwest University, Xi'an 710127, People's Republic of China. E-mail: jianhui@nwu.edu.cn

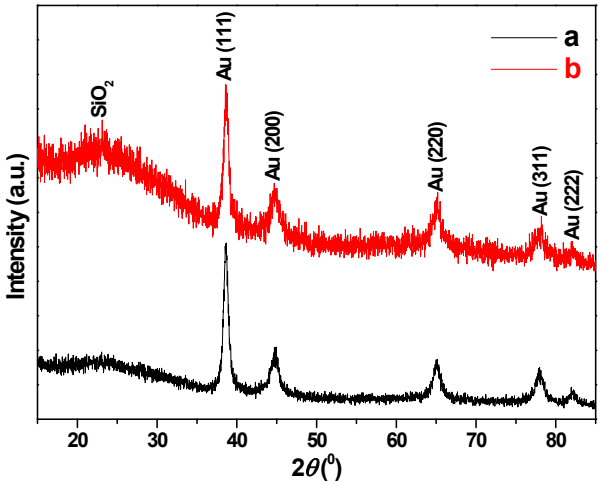

Fig. S1 XRD pattern of the products synthesized in the absence (a) and presence (b) of TEOS by the typical synthesis.

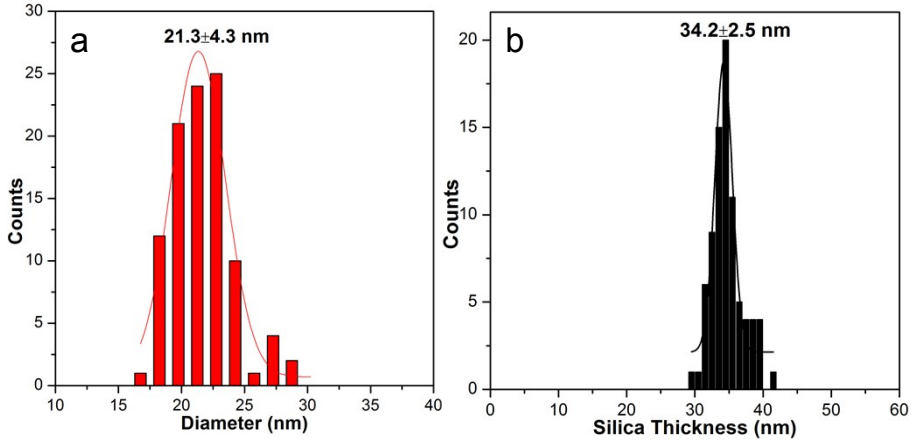

Fig. S2 The size distributions of Au core (a) and the shell thickness (b) of the Au@SiO_2 core-shell NPs shown in Fig. 1.

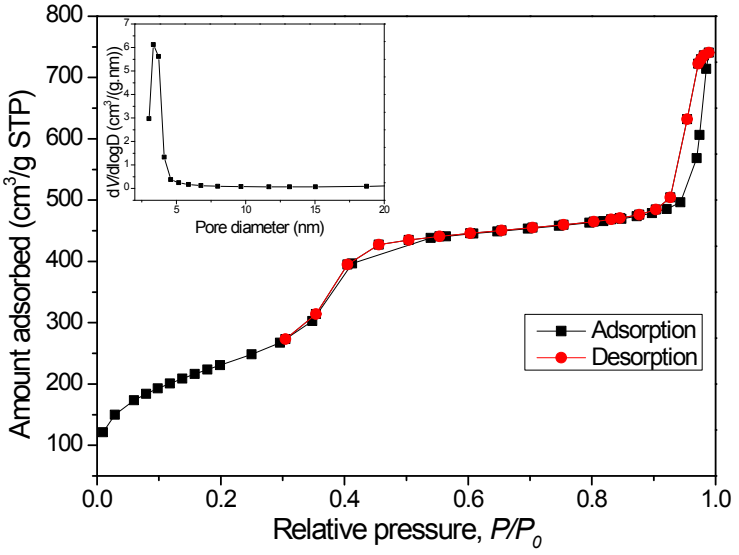

Fig. S3 N_2 sorption isotherms of the Au@SiO_2 NPs obtained by the typical synthesis.

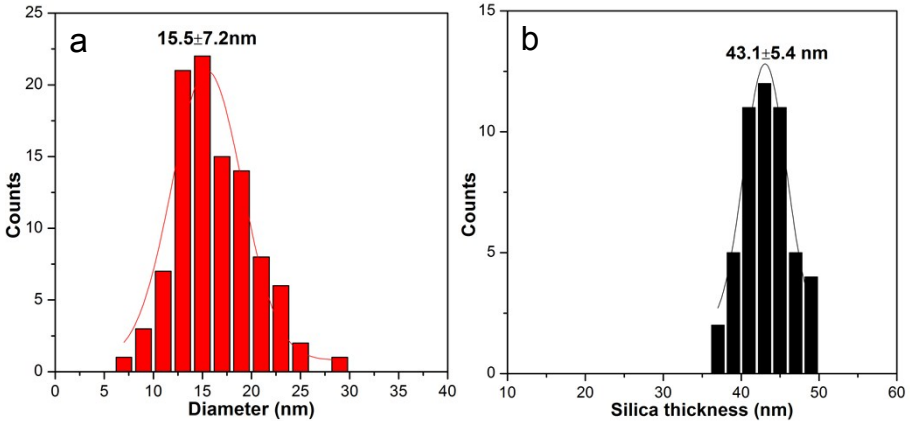

Fig. S4 The size distributions of Au core (a) and the shell thickness (b) of the Au@SiO_2 core-shell NPs shown in Fig. 2a.

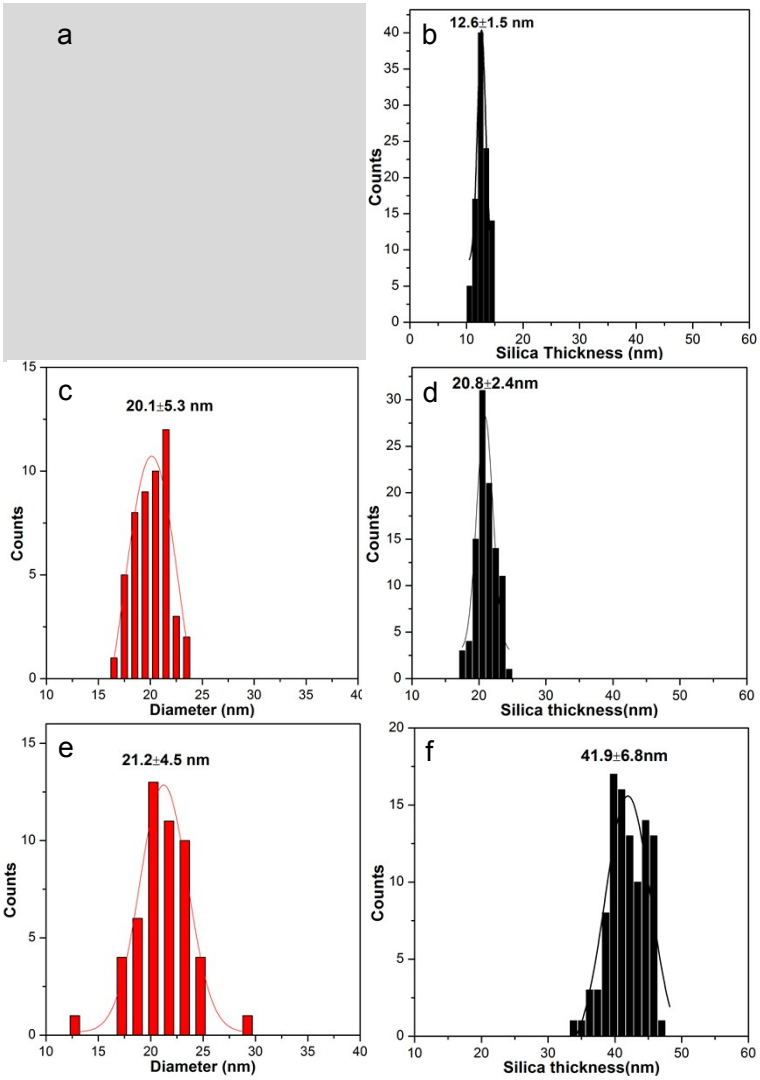

Fig. S5 The size distributions of Au core (a, c, e) and the shell thickness (b, d, f) of the Au@SiO_2 core-shell NPs shown in Fig. 2b, 2c and 2d, respectively.

Table S1 The experimental conditions for Au@SiO_2 core-shell NPs.

$HAuCl_4$/ (8.14 mmol/L, mL)	CTAB/(g)	TEOS/ (mL)	The diameter of Au core (nm)	The thickness of silica shell (nm)	Figure number
2.0	0.7	0.10	21.3±3.9	34.2±2.5	Fig. 1, Fig. S2
1.0	0.7	0.10	15.5±7.2	43.1±5.4	Fig. 2a, Fig. S4
2.0	0.7	0.05	21.3±4.3	12.6±1.5	Fig. 2b, Fig. S5a, b
2.0	0.7	0.08	20.1±5.3	20.8±2.4	Fig. 2c, Fig. S5c, d
2.0	0.7	0.13	21.2±4.6	41.9±6.8	Fig. 2d, Fig. S5e, f

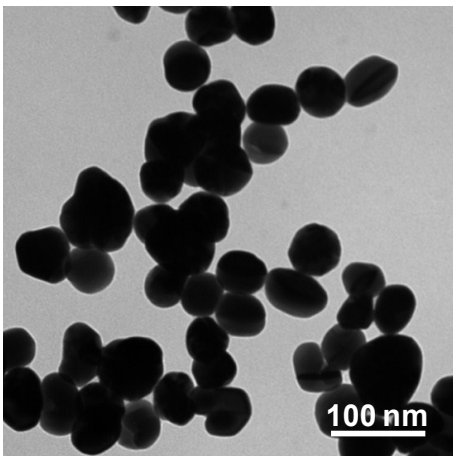

Fig. S6 TEM image of Au NPs synthesized by a typical process in the absence of CTAB.

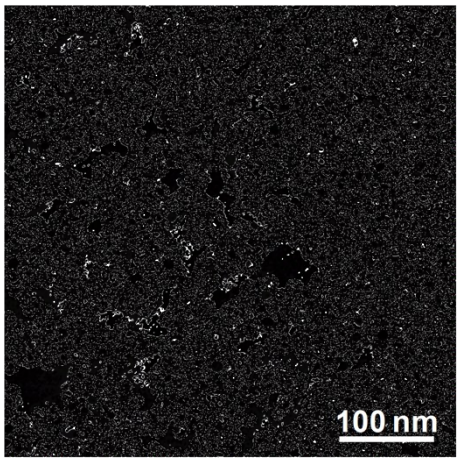

Fig. S7 TEM image of Au NPs synthesized by a typical process in the absence of TEOS.

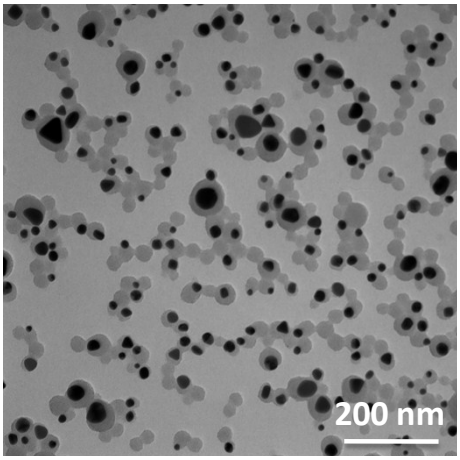

Fig. S8 TEM image of the product synthesized by a typical process at 60 °C.

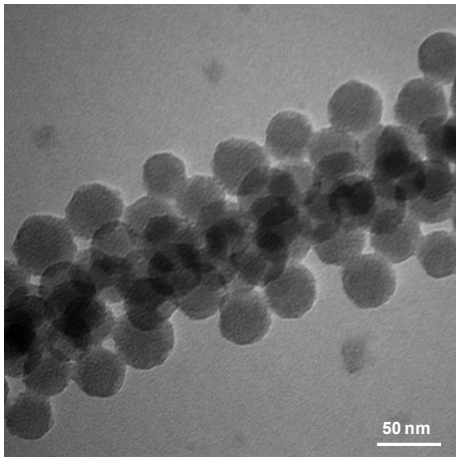

Fig. S9 TEM image of silica NPs synthesized by a typical process in the absence of $HAuCl_4$, while maintaining the same reaction condition.

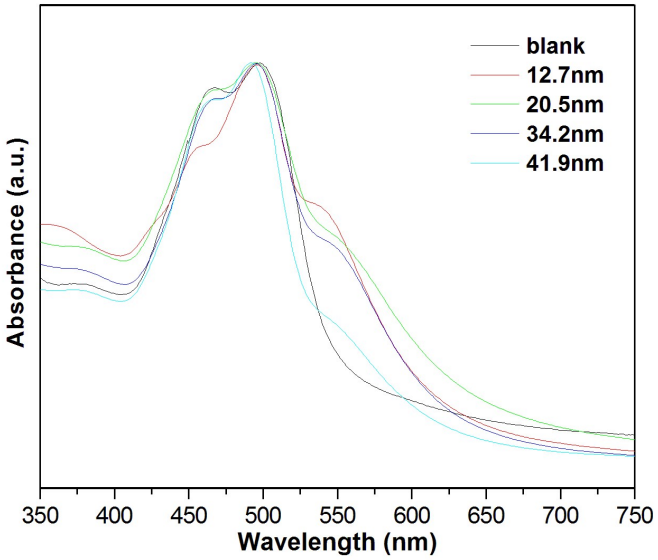

Fig. S10 Uv-vis absorption spectra of FITC modified SiO_2 (blank, as shown in Fig. S9) and Au@SiO_2 core-shell NPs with different silica shell thickness.