

**Supporting Information for**

**One-pot synthesis of novel water-dispersible fluorescent silicon nanoparticles for  
selective  $\text{Cr}_2\text{O}_7^{2-}$  sensing**

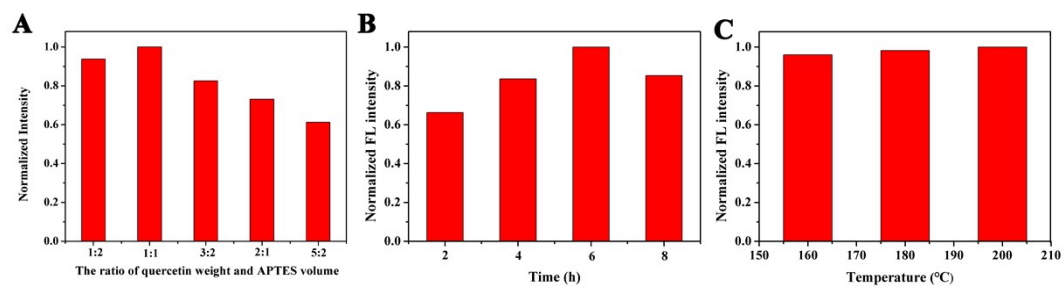
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PR China*

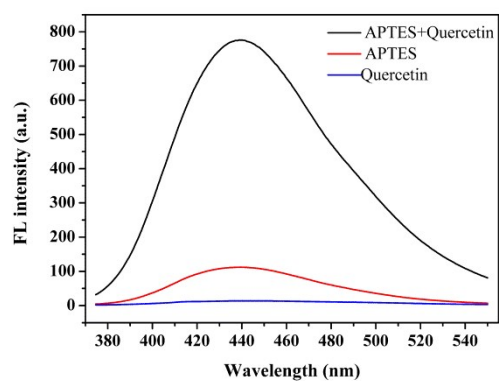
<sup>1</sup> Q.Q. Wen and C.J. Pan contributed equally to this work as first authors.

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Medicine, Zhengzhou, 450046, China

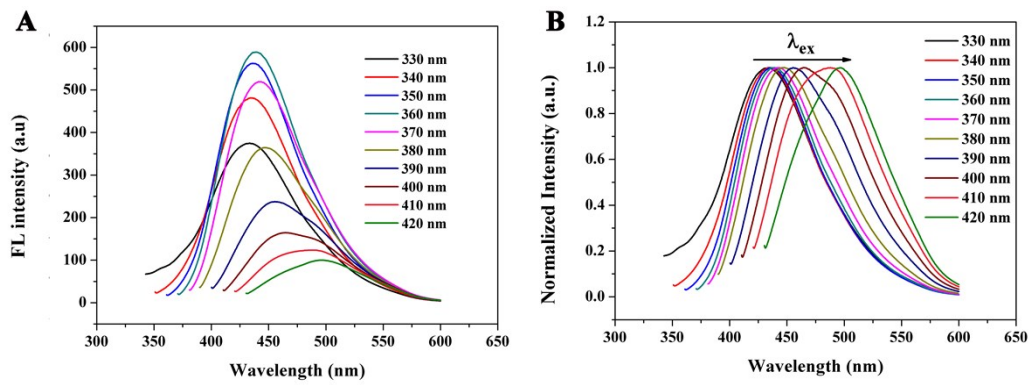
E-mail address: pancongjie@hactcm.edu.cn (C.J. Pan); fengsx221@163.com (S.X.  
Feng).



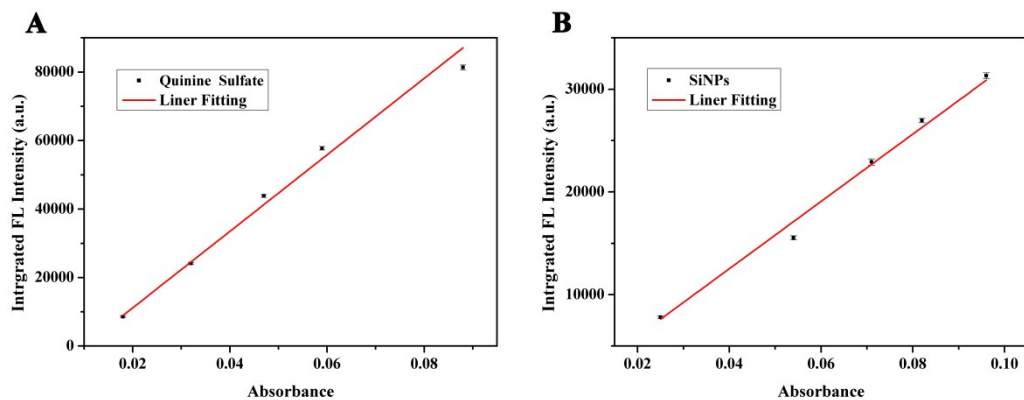
**Figure S1** Normalized FL intensity of the SiNPs synthesized at different ratio of quercetin weight and APTES volume (A), different reaction time (B) and different reaction temperature (C).



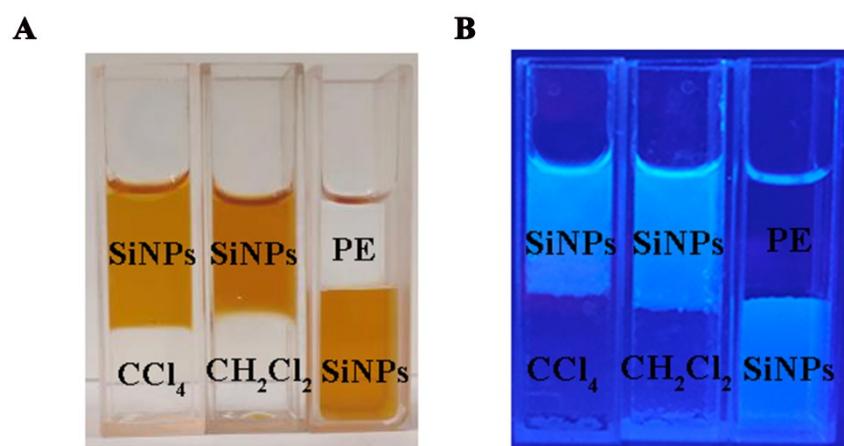
**Figure S2** Fluorescence emission spectra of the reaction product by preparing with APTES+Quercetin, APTES, and Quercetin ( $\lambda_{\text{ex}}=362$  nm).



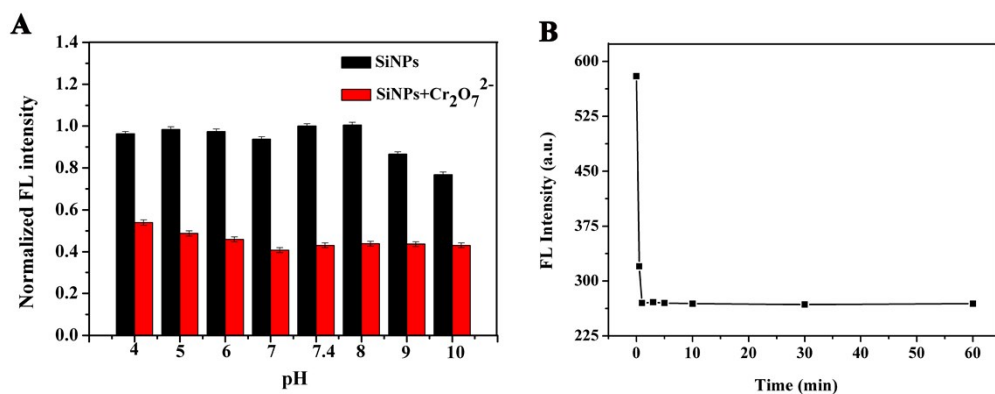
**Figure S3** FL intensity (A), and normalized FL intensity (B) of the prepared SiNPs at different excitation wavelengths.



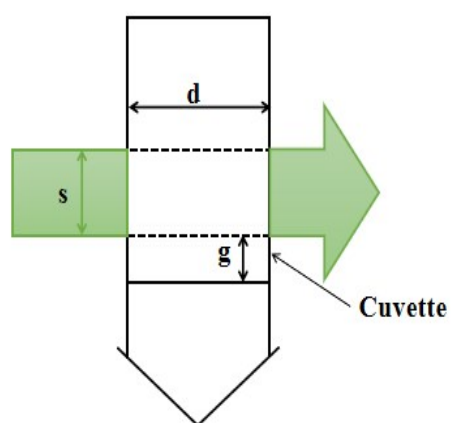
**Figure S4** Plots of integrated FL intensity of quinine sulfate (A) and the prepared SiNPs (B) as a function of optical absorbance at 362 nm. Three repeated measurements were completed for each point.



**Figure S5** Photographs of the SiNPs in mixtures of water and carbon tetrachloride ( $\text{CCl}_4$ ), water and dichloromethane ( $\text{CH}_2\text{Cl}_2$ ), and water and petroleum ether (PE) under visible light (A) and 365 nm UV light (B).



**Figure S6** (A) Normalized FL intensity of the SiNPs (black bars) and the subsequent addition of 50  $\mu\text{M}$   $\text{Cr}_2\text{O}_7^{2-}$  (red bars) at different pH values. (B) Time-dependent FL intensity of the SiNPs with the addition of  $\text{Cr}_2\text{O}_7^{2-}$  (50  $\mu\text{M}$ ) at room temperature.



**Figure S7** parameters related to equation 1.



**Table S1** Parameters for quantum yield calculation.

	Quinine Sulfate				SiNPs			
Abs	0.018	0.032	0.047	0.059	0.025	0.054	0.071	0.082
		0.088				0.096		
Integrated FL	8562.10	24131.69	43834.99		7804.8	15537.48	22925.05	
		57775.71	71393.29		26958.46	31310.57		
Lope		$9.18 \times 10^5$				$3.40 \times 10^5$		
QY		55.00%				20.34%		

**Table S2** Parameters for calculate IFE of  $\text{Cr}_2\text{O}_7^{2-}$  on the fluorescence of the SiNPs.

$\text{Cr}_2\text{O}_7^{2-}$ ( $\mu\text{M}$ )	$A_{\text{ex}}^{\text{a}}$	$A_{\text{em}}^{\text{b}}$	$CF^{\text{c}}$	$F_{\text{obsd}}^{\text{d}}$	$F_{\text{cor}}^{\text{e}}$	$E_{\text{obsd}}^{\text{f}}$	$E_{\text{cor}}^{\text{g}}$
0	0.232	0.098	1.442	602	868	0.0000	0.0000
1	0.245	0.089	1.447	584	845	0.0299	0.0265
5	0.293	0.099	1.538	523	804	0.1312	0.0723
10	0.328	0.097	1.589	504	801	0.1628	0.0772
20	0.435	0.107	1.785	451	805	0.2508	0.0726
30	0.537	0.115	1.983	402	797	0.3322	0.0818
40	0.645	0.124	2.208	361	797	0.4003	0.0818

<sup>a</sup> $A_{\text{ex}}$  and <sup>b</sup> $A_{\text{em}}$  are the absorbance of the SiNPs upon addition of  $\text{Cr}_2\text{O}_7^{2-}$  at 362 and 437 nm, respectively.

<sup>c</sup>Corrected factor ( $CF$ ) is calculated as  $F_{\text{cor}}/F_{\text{obsd}}$ .

<sup>d</sup> $F_{\text{obsd}}$  is the measured FL intensity of the SiNPs upon addition of  $\text{Cr}_2\text{O}_7^{2-}$  at 437 nm.

<sup>e</sup> $F_{\text{cor}}$  is the corrected FL intensity with Eq. (1) by removing IFE from the measured FL intensity ( $F_{\text{obsd}}$ ).

<sup>f</sup> $E_{\text{obsd}}=1-F_{\text{obsd}}/F_{\text{obsd},0}$ , in which  $F_{\text{obsd},0}$  is the observed FL intensities of the SiNPs in the absence of  $\text{Cr}_2\text{O}_7^{2-}$ .

<sup>g</sup> $E_{\text{cor}}=1-F_{\text{cor}}/F_{\text{cor},0}$ , in which  $F_{\text{cor},0}$  is the corrected FL intensities of the SiNPs in the absence of  $\text{Cr}_2\text{O}_7^{2-}$ .