

Supplementary Information

In situ Assembly of Monodisperse, Multifunctional Silica Microspheres Embedded with Magnetic and Fluorescent Nanoparticles and Application for Adsorption of methylene blue

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EXPERIMENTAL SECTION

Absorption experiments.

Typically, 20 mg of Fe₃O₄/YVO₄:Eu³⁺-SiO₂ was added to 40 mL of methylene blue solution with a concentration of 8 mg/L at room temperature. We will take out 1ml above solution every once a while. After magnetic separation, it was measured by UV/Vis absorption spectra and the absorption curve was obtained.

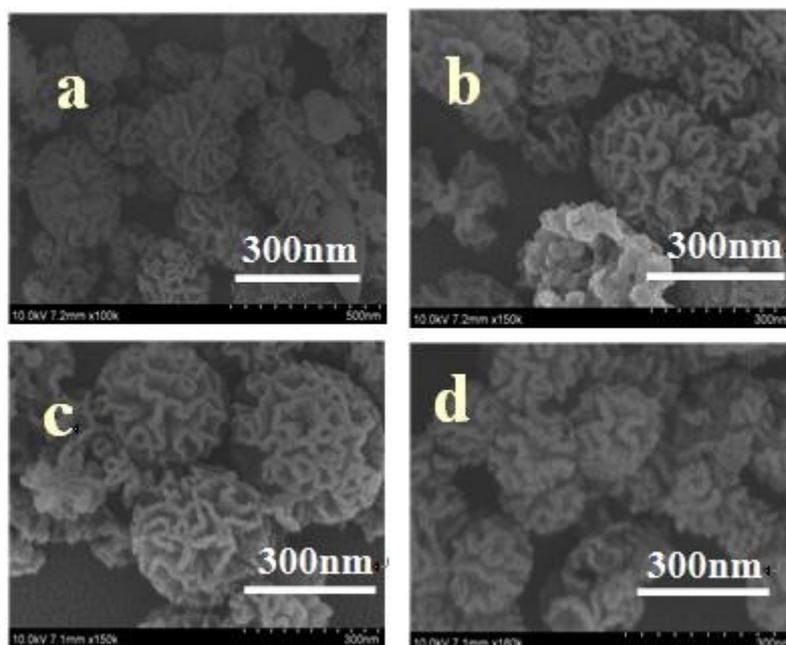


Fig. S1: SEM of $\text{Fe}_3\text{O}_4/\text{YVO}_4:\text{Eu}^{3+}\text{-SiO}_2$ with different mass of CTAB: 0g (a), 0.5g (b), 0.95g (c), 1.5g (d)

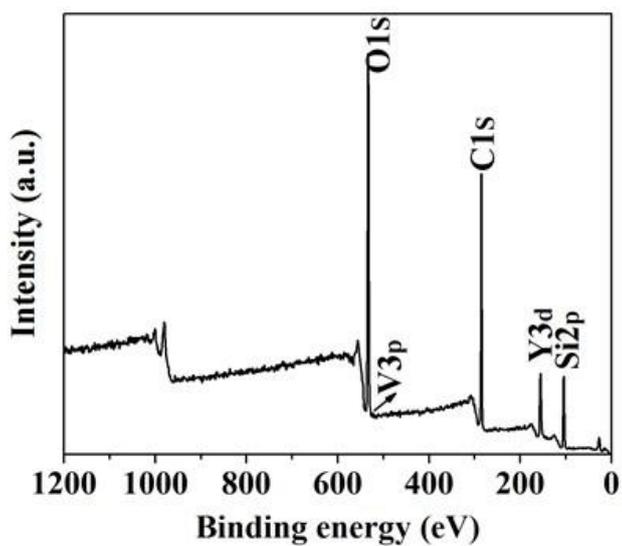


Fig. S2. XPS pattern of $\text{Fe}_3\text{O}_4/\text{YVO}_4:\text{Eu}^{3+}\text{-SiO}_2$ composites

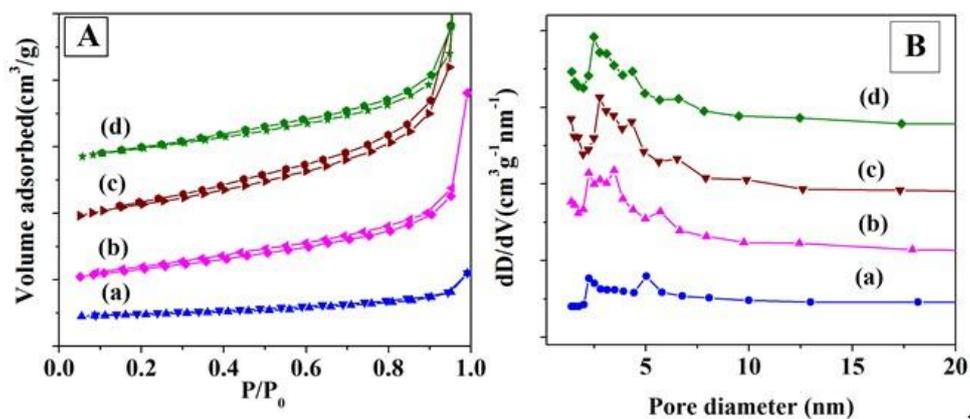


Fig. S3. (A) Nitrogen-sorption isotherms and (B) BJH pore-size distributions of Fe₃O₄/YVO₄:Eu³⁺-SiO₂ prepared by using different mass of CTAB as templates: (a) 0g, (b) 0.5g, (c) 0.95g and (d) 1.5g, respectively.

Table 1S: Physical and surface properties of samples

| Sample | specific surface area (m ² /g) | Pore Diameter (nm) | Total Pore Volume (cm ³ /g) |
|--------|---|--------------------|--|
| a | 55.8 | 5.02 | 0.217 |
| b | 302.6 | 3.47 | 0.956 |
| c | 457.7 | 2.76 | 2.364 |
| d | 347.3 | 2.48 | 1.706 |

Enclosure: Pure mesoporous SiO₂: specific surface area (406.1 m²/g), Pore Diameter (2.78 nm), Total Pore Volume (1.664 cm³/g)

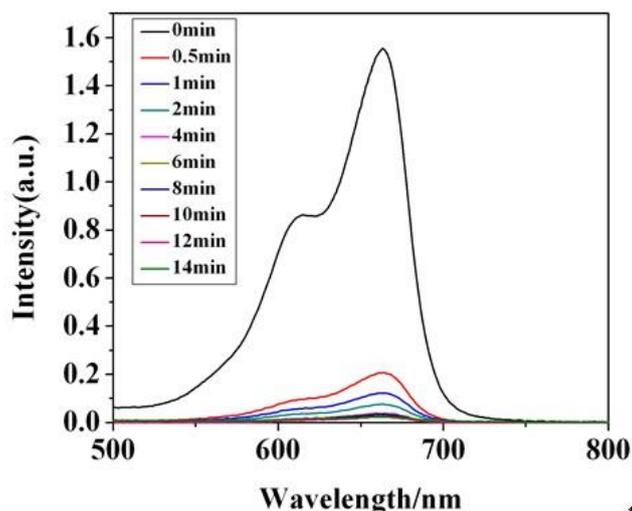


Fig. S4. UV/Vis absorption spectra of the methylene blue after adsorption by Fe₃O₄/YVO₄:Eu³⁺-SiO₂ with different time

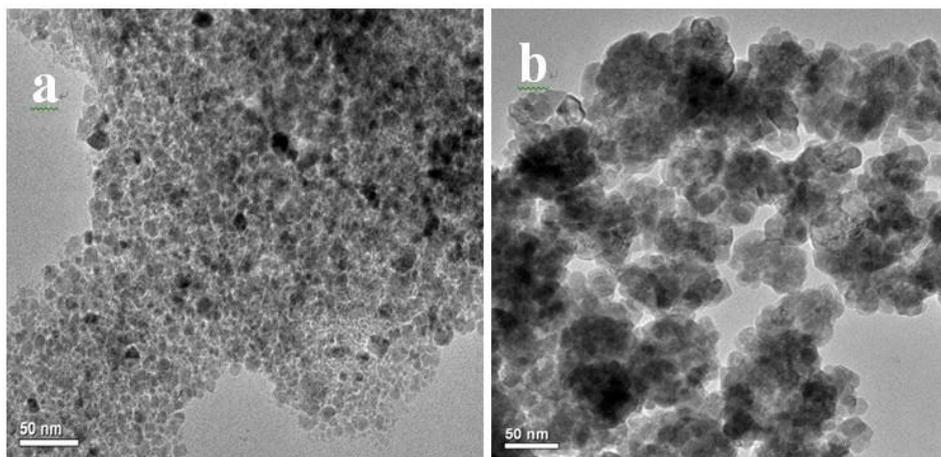


Fig. S5. TEM of Fe_3O_4 -oleate (a) and $\text{YVO}_4:\text{Eu}^{3+}$ -oleate (b)