Supplementary Information

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

Jianhui Shi*, Xiaozhen Ren, Lizhu Tong, Xiaodong Chen, Xuwei Yang and Hua Yang*

College of Chemistry, Jilin University, Changchun, 130012, China

*Corresponding author:

E-mail address: huayang86@sina.com

She is working in College of Environmental Science and Engineering, Taiyuan University of Technology, Taiyuan, 030024, China

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 Fe₃O₄/YVO₄:Eu³⁺-SiO₂ with different mass of CTAB: 0g (a), 0.5g (b), 0.95g (c), 1.5g (d)

Fig. S2. XPS pattern of Fe₃O₄/YVO₄:Eu³⁺-SiO₂ composites
Fig. S3. (A) Nitrogen-sorption isotherms and (B) BJH pore-size distributions of Fe$_3$O$_4$/YVO$_4$:Eu$^{3+}$-SiO$_2$ 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

<table>
<thead>
<tr>
<th>Sample</th>
<th>Specific Surface Area (m$^2$/g)</th>
<th>Pore Diameter (nm)</th>
<th>Total Pore Volume (cm$^3$/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>55.8</td>
<td>5.02</td>
<td>0.217</td>
</tr>
<tr>
<td>b</td>
<td>302.6</td>
<td>3.47</td>
<td>0.956</td>
</tr>
<tr>
<td>c</td>
<td>457.7</td>
<td>2.76</td>
<td>2.364</td>
</tr>
<tr>
<td>d</td>
<td>347.3</td>
<td>2.48</td>
<td>1.706</td>
</tr>
</tbody>
</table>

Enclosure: Pure mesoporous SiO$_2$: specific surface area (406.1 m$^2$/g), Pore Diameter (2.78 nm), Total Pore Volume (1.664 cm$^3$/g)

Fig. S4. UV/Vis absorption spectra of the methylene blue after adsorption by Fe$_3$O$_4$/YVO$_4$:Eu$^{3+}$-SiO$_2$ with different time
Fig. S5. TEM of Fe₃O₄-oleate (a) and YVO₄:Eu³⁺-oleate (b).