Supplementary information

Size-controlled synthesis of water-dispersible superparamagnetic Fe₃O₄ nanoclusters and their magnetic responsiveness

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Fig. S1 (a) TEM image at higher magnification and (b) HRTEM image of Fe₃O₄ particles synthesized with 80/0 of V₉₀EG/V₀EG.

Fig. S2 SEM images of Fe₃O₄ particles which were synthesized (a) without Na₃Cit and (b) with 0.1g Na₃Cit.

Table S1. Hydrodynamic size and PDI at different pHs for Fe₃O₄ nanoclusters synthesized with 1g Na₃Cit under V₉₀EG/V₀EG =40/40.

<table>
<thead>
<tr>
<th>pH</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-Average Diameter (nm)</td>
<td>247.9</td>
<td>1473</td>
<td>1161</td>
<td>207.8</td>
<td>219.2</td>
<td>220</td>
<td>210.4</td>
<td>213.9</td>
<td>205.4</td>
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<tr>
<td>PDI</td>
<td>0.112</td>
<td>0.853</td>
<td>0.745</td>
<td>0.163</td>
<td>0.078</td>
<td>0.063</td>
<td>0.065</td>
<td>0.024</td>
<td>0.085</td>
</tr>
</tbody>
</table>
Fig. S3 A typical intensity particle size distribution at pH=7 for Fe₃O₄ nanoclusters synthesized with 1 g Na₃Cit under V_{DEG}/V_{EG}=40/40.

Fig. S4 FTIR spectra of Fe₃O₄ nanoparticles synthesized with 1g Na₃Cit (a) and the uncoated magnetite particles synthesized by co-precipitation (b).
Fig. S5 Reflectance spectra of the 168 nm Fe$_3$O$_4$ nanoclusters with water dispersions of about 16.3 mg·mL$^{-1}$ as the magnetic field increased from 180 G to 590 G by moving the magnet toward the sample (2.6 cm to 1.5 cm).