Supplementary Information for

**Shape-controlled synthesis of α-Fe₂O₃ nanocrystals for efficient adsorptive removal of Congo red**

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Synthesis of the ligand 2,4,6-Tris(pyrazol-1-yl)-1,3,5-triazine (Tptz)

Tptz can be easily obtained via the reported method.\textsuperscript{1} Typically, cyanuric chloride (1.84 g, 10 mmol) and pyrazole (4.08 g, 60 mmol) were mixed and stirred rapidly without solvent for 5 min at 60 °C. Then, the reaction mixture was dissolved in 100 mL chloroform and washed with 100 mL distilled water. The organic layer was collected and aqueous layer was further extracted with chloroform (3×50 mL). The combined organic layer was dried over anhydrous MgSO\textsubscript{4} and evaporated to dryness. The resulting white powder was collect and the \textsuperscript{1}H-NMR data were identical with those reported in literature.

\textsuperscript{1} D. Azarifar, M. A. Zolfigol and A. Forghaniha, \textit{Heterocycles}, 2004, 63, 1897-1901.
Fig. S1. The FT-IR spectrum of the obtained products A1, A2 and A3.
Fig. S2. TEM images of the products obtained from pure H₂O. (a, scale bar = 200 nm; b, scale bar = 50 nm).
Fig. S3. PXRD pattern of the synthesized sample in pure H$_2$O.
Fig S4. PXRD patterns of the synthesized samples in the absence of Tptz in three kinds of mixed solvent DMF/H$_2$O.
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<tr>
<th>TPTz·FeCl₃·6H₂O</th>
<th>DMF/H₂O=6:2 mL</th>
<th>DMF/H₂O=4:4 mL</th>
<th>DMF/H₂O=2:6 mL</th>
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<td>0.1:0.2 mmol</td>
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<td>0.3:0.2 mmol</td>
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<td>0.4:0.2 mmol</td>
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<td>0.5:0.2 mmol</td>
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Fig S5. TEM images of the samples obtained from different solvent DMF/H₂O in the presence of 0.1-0.5 mmol Tptz.
Fig. S6. Nitrogen adsorption–desorption isotherms (left) and Barrett-Joyner-Halenda (BJH) pore size distribution profiles (right) of A1, A2 and A3.
Fig. S7. Recycle test of CR removal efficiency of α-Fe$_2$O$_3$ A3.