Supplementary Information

Synthesis of yolk/shell Fe₃O₄@poly(ionic liquid)s-derived nitrogen doped graphitic porous carbon materials and its application as support for nickel catalysts

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Fig. S1 FT-IR spectra of Fe₃O₄, and Fe₃O₄@SiO₂
Fig. S2 XRD patterns of Fe$_3$O$_4$@SiO$_2$ (A), and Fe$_3$O$_4$@SiO$_2$@PCMVImCl (B)

Fig. S3 Pore size distribution plot obtained from the adsorption branch of the isotherm for YS Fe$_3$O$_4$@PIL-d-(N)GPC.
Table S1 Influence of solvent, and the amount of catalyst on reduction reaction of 4-nitrotoluene.\(^a\)

<table>
<thead>
<tr>
<th>Entry</th>
<th>Amount of catalyst (Ni(0) content/mol %)</th>
<th>Solvent</th>
<th>Isolated Yield (%)</th>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>DMSO</td>
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<tr>
<td>2</td>
<td>1</td>
<td>MeOH</td>
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<tr>
<td>3</td>
<td>1</td>
<td>EtOH</td>
<td>83</td>
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<td>4</td>
<td>1</td>
<td>H(_2)O</td>
<td>90</td>
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<tr>
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<tr>
<td>7</td>
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<td>81</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>H(_2)O</td>
<td>-</td>
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</table>

\(^a\) Reaction conditions: 1 mmol 4-nitrotoluene, 0.5 mmol NaBH\(_4\), 5 mL solvent, NiNPs@YS Fe\(_3\)O\(_4@PIL-d-(N)GPC as catalyst.
Fig. S4 $^1$H NMR spectrum of p-toluidine in DMSO-$d_6$. 
Fig. S5 $^1$H NMR spectrum of 4-methoxyaniline in CDCl$_3$. 
Fig. S6 $^1$H NMR spectrum of naphthalen-1-amine in CDCl$_3$. 
Fig. S7 $^1$H NMR spectrum of 4-fluoroaniline in CDCl$_3$. 
Fig. S8 $^1$H NMR spectrum of 3-iodoaniline in CDCl$_3$. 
Fig. S9 $^1$H NMR spectrum of 4-bromoaniline in CDCl$_3$. 
Fig. S10 $^1$H NMR spectrum of ethanamine in DMSO-$d_6$. 
Fig. S11 $^1$H NMR spectrum of phenylmethanamine in CDCl$_3$. 
Fig. S12 \(^1\)H NMR spectrum of pyridin-2-ylmethanamine in CDCl\(_3\).
Fig. S13 $^1$H NMR spectrum of 2-methylpropan-1-amine in CDCl$_3$. 
Fig. S14 $^1$H NMR spectrum of 3-Cyanomethyl-1-vinylimidazolium chloride in DMSO-$d_6$. 