Palladium nanoparticles immobilized on core-shell magnetic fibrous as highly efficient and recyclable heterogeneous catalyst for reduction of 4-nitrophenol and Suzuki coupling reactions

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**Fig. S1** UV-Vis spectra of 4-NP/NaBH₄ solution when adding Fe₃O₄@SiO₂@KCC-1 as catalyst at the reaction time of about 0 h and 2 h, inset image the colour change of the 4-NP/NaBH₄/Fe₃O₄@SiO₂@KCC-1 mixture at the reaction time of about 0 h and 2 h.

**Table 1** The control reactions of Fe₃O₄@SiO₂@mSiO₂ and Fe₃O₄@SiO₂@mSiO₂-Pd(II) catalyst in the cross coupling reaction between 1-Iodo-4-nitrobenzene and phenylboronic acid were carried out.
**Fig. S1** UV-Vis spectra of 4-NP/NaBH$_4$ solution when adding Fe$_3$O$_4$@SiO$_2$@KCC-1 as catalyst at the reaction time of about 0 h and 2 h, inset image the colour change of the 4-NP/NaBH$_4$/Fe$_3$O$_4$@SiO$_2$@KCC-1 mixture at the reaction time of about 0 h and 2 h.

**Table 1**

The control reactions of Fe$_3$O$_4$@SiO$_2$@KCC-1 and Pd/Fe$_3$O$_4$@SiO$_2$@KCC-1 catalyst in the cross coupling reaction between 1-Iodo-4-nitrobenzene and phenylboronic acid were carried out.

<table>
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<th>Entry</th>
<th>Catalyst</th>
<th>Time (h)</th>
<th>Yield (%)</th>
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<tbody>
<tr>
<td>1</td>
<td>Fe$_3$O$_4$@SiO$_2$@KCC-1</td>
<td>3</td>
<td>97</td>
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<tr>
<td>2</td>
<td>Pd/Fe$_3$O$_4$@SiO$_2$@KCC-1</td>
<td>3</td>
<td>97</td>
</tr>
</tbody>
</table>

* Reaction condition: aryl halide (0.5 mmol), aryl boronic acid (0.75 mmol), base (1.0 mmol), ethanol 5.0 mL, 0.01 g catalyst, in air, 3 h.

* Yield was determined by GC analysis.