Supporting Information

A General Chiral Selector Immobilized on Silica Magnetic Microspheres for Direct Separation of Racemates

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Figure S1. XRD patterns of Fe₃O₄ and Fe₃O₄@SiO₂ microspheres.

Peaks at 18.290 °, 30.157 °, 35.587 °, 43.242 °, 53.679 °, 57.183 ° and 62.850 ° were assigned to (111), (220), (311), (400), (422), (511) and (440) reflections spectrum of Fe₃O₄, respectively.

The average crystallite size D of the particles is calculated from the Scherrer equation: 

\[ D = \frac{K\lambda}{\beta \cos \theta} \]

where K is the Debye-Scherrer constant (0.89), \( \lambda \) is the X-ray wavelength, \( \beta \) is the peak width of half-maximum, and \( \theta \) is the Bragg diffraction angle. Here, the (311) peak of the highest intensity was picked out to evaluate the particle diameter of Fe₃O₄. And D was calculated to be about 18 nm. No apparent change was observed in XRD spectra after silica coating, indicating that the silica shell formed on the surface of magnetite was amorphous.

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Figure S2 FT-IR spectrum of Fe$_3$O$_4$.
Characteristic absorption of Fe-O bond was observed at 588.9 cm$^{-1}$.

Figure S3 FT-IR spectra of mirocrystalline cellulose (MC)
Figure S4 Chemical structures of five racemates

Benzoin Methyl Ether

Promethazine Hydrochloride

(+/-)-2-Phenoxypropionic Acid

4-phenyl-1,3-Dioxane

DL-sec-phenethyl alcohol

Figure S5 HPLC analysis of racemate benzoin methyl ether (a), supernantant after interaction with CMM collected immediately (b) and supernatant after remaining with CMM for 15min (c)
<table>
<thead>
<tr>
<th>Sample</th>
<th>(+) benzoin methyl ether</th>
<th>(-) benzoin methyl ether</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>$1.31 \times 10^6$</td>
<td>$1.31 \times 10^6$</td>
</tr>
<tr>
<td>b</td>
<td>$1.19 \times 10^6$</td>
<td>$1.11 \times 10^6$</td>
</tr>
<tr>
<td>c</td>
<td>$1.18 \times 10^6$</td>
<td>$1.18 \times 10^6$</td>
</tr>
</tbody>
</table>

Racemate sample of benzoin methyl ether (a), supernatant after interaction with CMM collected immediately (b) and supernatant after remaining with CMM for 15 min (c), determined by HPLC on a chiral stationary phase. Retention times of (+) benzoin methyl ether and (-) benzoin methyl ether are 8.886 min and 13.022 min respectively.