Electronic supplementary information (ESI)

Preparation of Fe_3O_4@C magnetic microspheres

The Fe_3O_4@C magnetic microspheres were synthesized by hydrothermal reaction of glucose on Fe_3O_4 magnetic microspheres as per the described method with slight modification.[1] In briefly, added 100 mg of dried Fe_3O_4 microspheres into a 50 mL of 0.1 M HNO_3 and ultra-sonicated for 15-20 min followed by washing with deionized water and separated by magnetic decantation. The acid treated magnetic microspheres were dispersed in 50 mL of aqueous 0.5 M glucose solution via vigorous stirring for 20 min. The resultant Fe_3O_4 microspheres-glucose suspension was sealed in a Teflon-lined stainless-steel autoclave and heated to and maintained at 180 ºC for 4 h and then allowed to cool to room temperature. The obtained black colored suspended Fe_3O_4@C magnetic microspheres were washed several times with water and ethanol, respectively, and separated by magnetic decantation. Finally, the Fe_3O_4@C magnetic microspheres were oven dried at 80 ºC for 6-8 h.

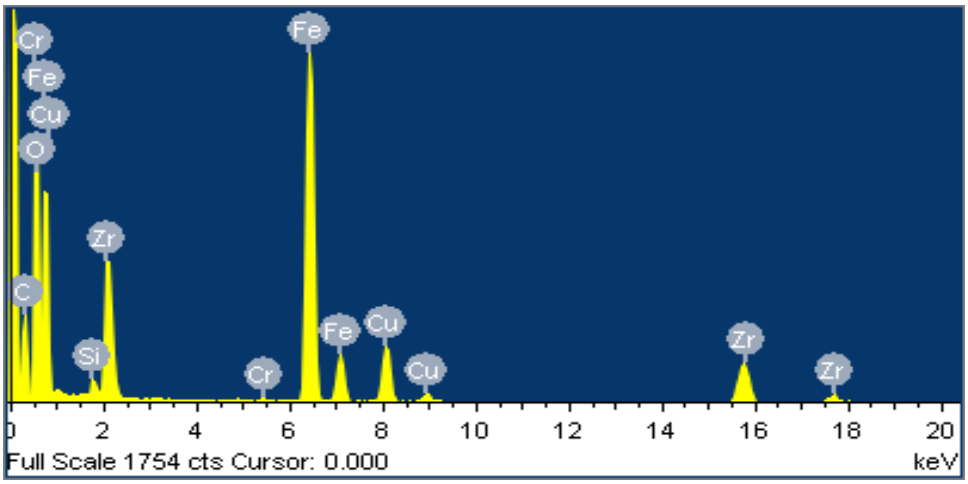

Fig. S1. The energy-dispersive X-ray analysis (EDAX) of Fe_3O_4@ZrO_2 magnetic microspheres

Synthesis of cellulose tris(3,5-dimethylphenylcarbamate) (CDMPC)

The CDMPC was prepared as per the reported method.[2] The cellulose powder (1 g) was dried in a vacuum oven at 100 ºC for 4 h to remove the chemically absorbed water. Dried cellulose was refluxed in 25 mL of dry pyridine for 12 h. After cooling the mixture to room temperature, an excess of 3,5-dimethylphenyl isocyanate was added dropwise to the cellulose suspension under constant magnetic stirring and the reaction was continued at 100 ºC for 24 h under reflux. The final product, dark amber viscous, mostly homogeneous liquid, was cooled to room temperature. The product was isolated as the methanol-insoluble fraction and purified by reprecipitation from an acetone solution. The white solid was vacuum filtered, washed several times with methanol, and dried in air, then under vacuum to a constant weight. ^{1}H-NMR (300 MHz) spectrum of CDMPC expressed the following characteristic absorptions: 8.0-8.5 (H of amide groups), 2.7-5.1 (H of cellulose ring and methylene in position 6), 2-2.3 ppm (H of CH_3-aryl groups).

FT-IR Spectra of Fe_3O_4@C and Fe_3O_4@ZrO_2

The FT-IR spectrum of Fe_3O_4@C (Fig. 2) shows the characteristic absorption band of Fe–O bond at 576 cm^{-1}. Apart from that new absorption peaks at 1700 and 1618 cm^{-1} which are attributed to C=O and C=C, respectively, proving the carbonization of glucose on hydrothermal reaction. The IR spectral frequencies between 1400-1200 corresponds to hydrophilic groups of –C–O stretching and –OH bending vibrations, suggesting their high adsorption. These hydrophilic groups can enhance the affinity between the microspheres and the prehydrolyzed zirconium isopropoxide. The FT-IR spectrum of the as-synthesized Fe_3O_4@ZrO_2 microspheres (Fig. 2) shows a new absorption band corresponding to the characteristic absorption of zirconia at ~634 cm^{-1} was observed, which further confirmed the successful formation of Fe_3O_4@ZrO_2 magnetic microspheres.

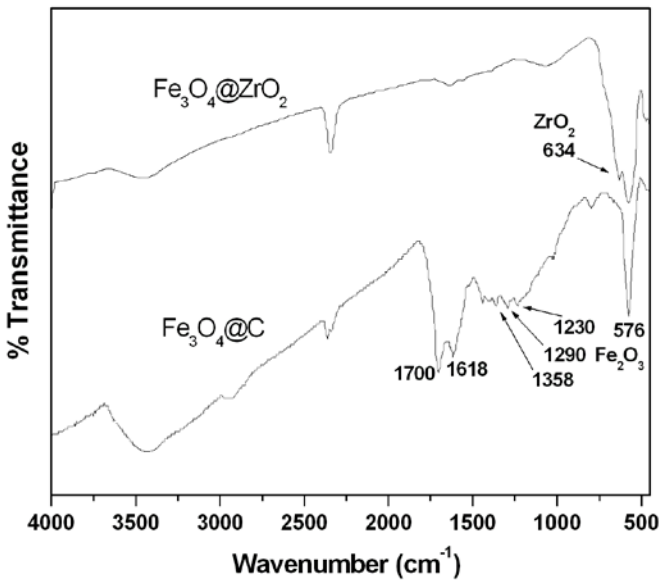

Fig. S2. FT-IR spectra of Fe_3O_4 @C and Fe_3O_4 @ZrO_2

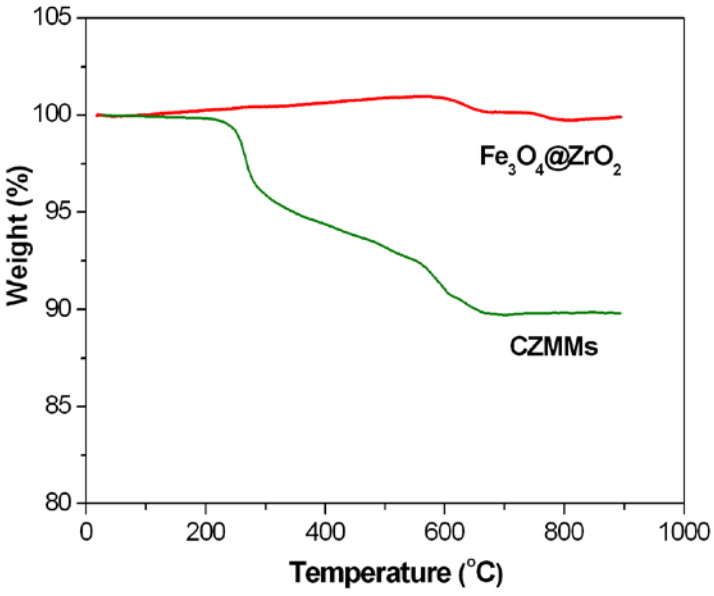

Fig. S3. TGA curves of Fe_3O_4 @ZrO_2 and CZMMs.

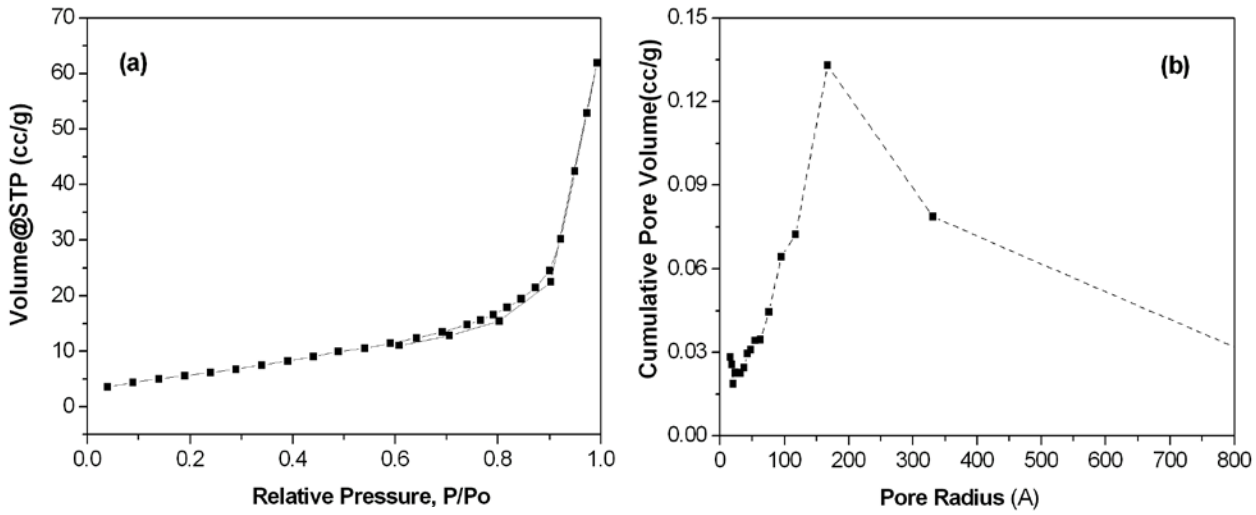

Fig. S4. (a) Nitrogen adsorption/desorption isotherm and (b) pore size distribution of CZMMs

Structures of chiral drugs

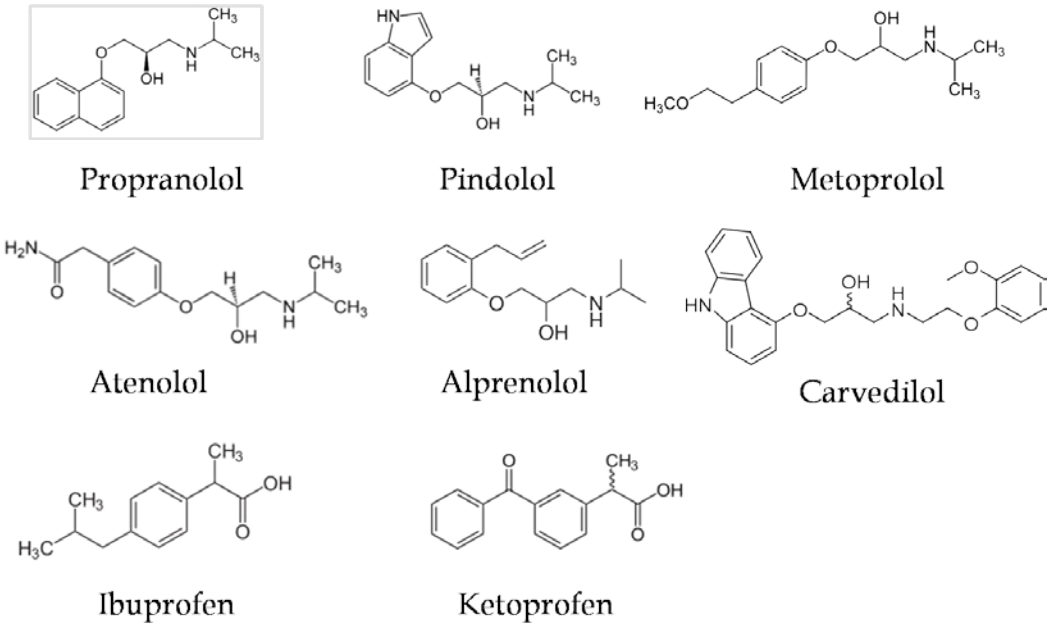

Table S1. Separation of ibuprofen enantiomers on CZMMs at different pHs

pH	Measured optical rotation[a,b]	
	Racemic ibuprofen	Supernatant of racemic ibuprofen collected after isolated from CZMMs
2.0	-0.004	-13.14
4.5	0.002	-14.20
7.5	0.002	-15.12
10.0	0.000	-15.45

[a] $[\alpha]^{22}_{D}$ deg cm^2 g (3 mg mL^{-1} in 0.025 M ammonium acetate buffer)

[b] Average of three determinations

References

1. Y. Li, T. H. Leng, H. Q. Lin, C. H. Deng, X. Q. Xu, N. Yao, P. Y. Yang and X. M. Zhang, J. *Proteome Res*., 2007, **6**, 4498–4510.

2. Y. Okamoto, M. Kawashima and K. Hatada, *J. Chromatogr*. 1986, **363**, 173–186.