Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Biomimetic snowflake-shaped magnetic micro-/nanostructures for highly-efficient adsorption of heavy metal ions and organic pollutants from aqueous solution

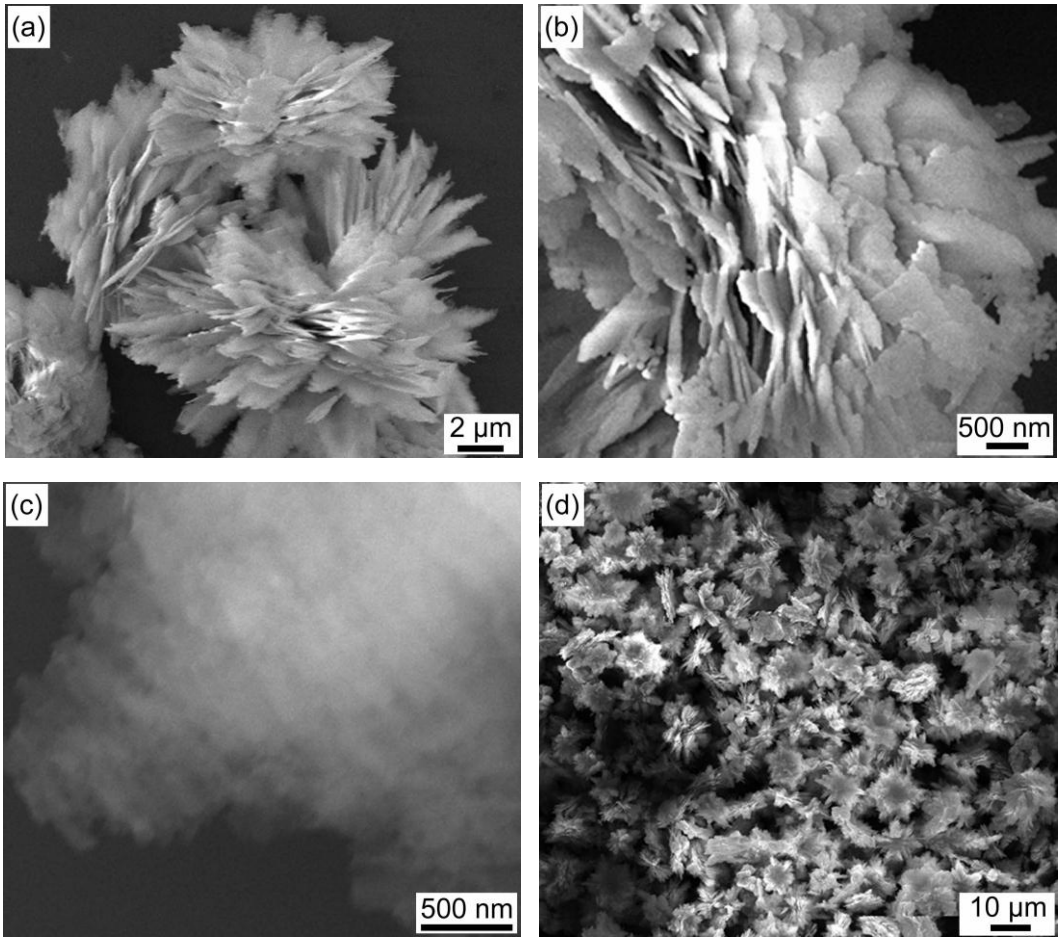

Fig. S1 (a) Low- and (b) high-magnification FESEM images of the profile side of the synthesized precursors; (c) high-magnification top view FESEM image of the precursor; and (d) low-magnification FESEM image of the final $ZnO@SiO_2@Fe_3O_4$/C micro-/nanostructures to show a large yield.

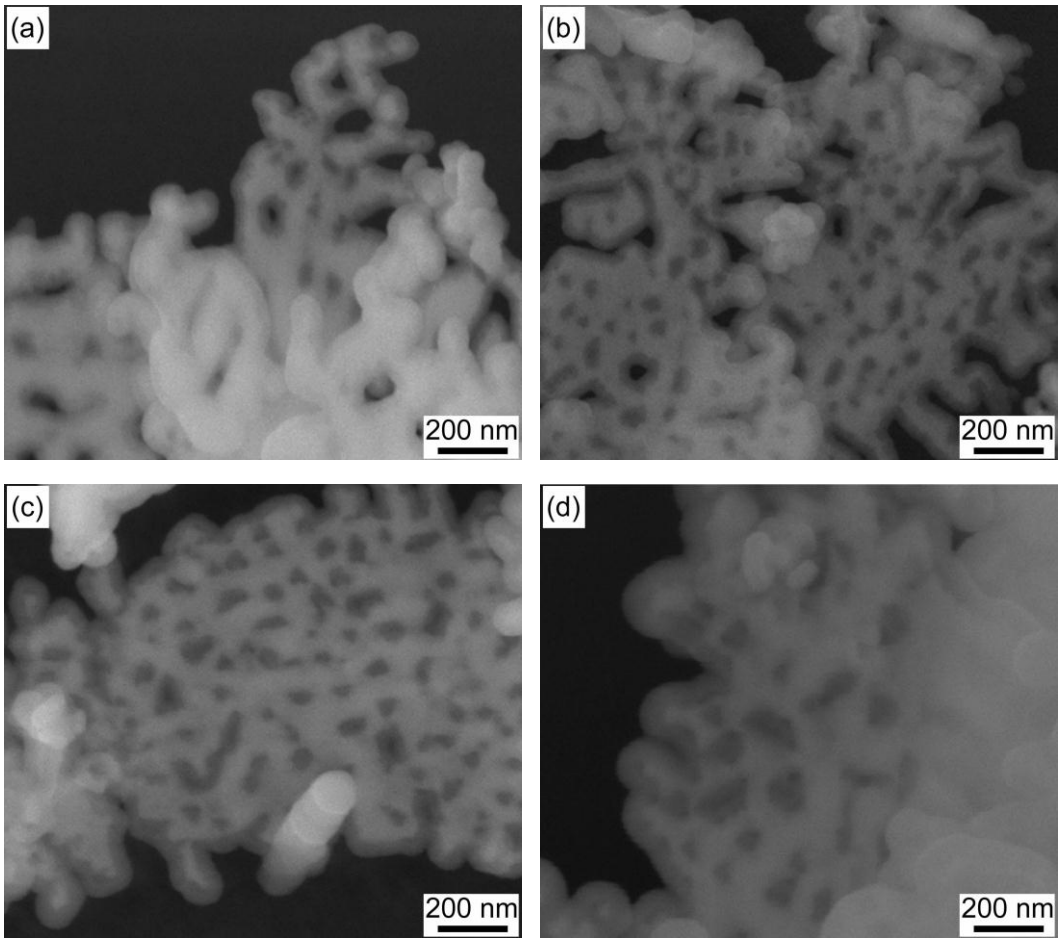

Fig. S2 The SiO_2-coated ZnO micro-/nanostructures using different amount of TEOS: (a) 0.5 mL; (b) 0.8 mL; (c) 1.2 mL; and (d) 1.5 mL.

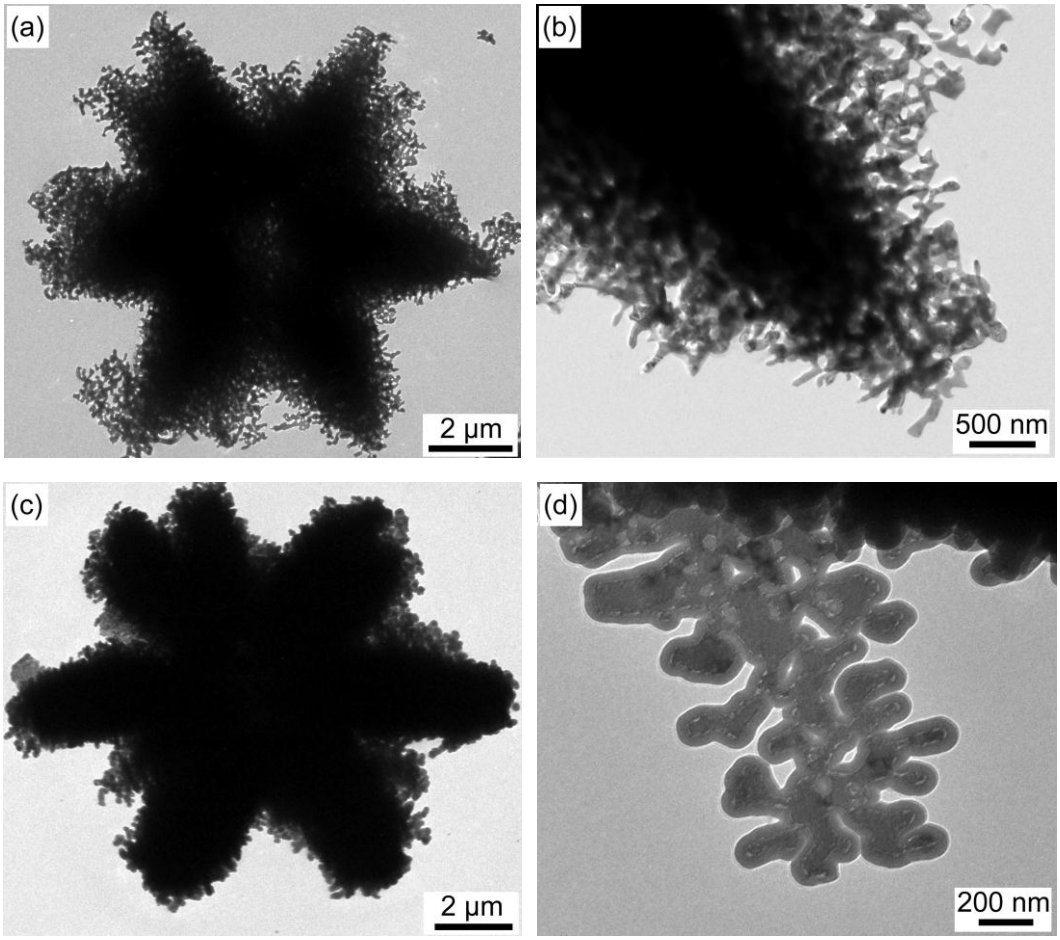

Fig. S3 (a) Low- and (b) high-magnification TEM images of the porous ZnO; (c) low- and (d) high-magnification TEM images of the ZnO@SiO_2 micro-/nanostructure.

Table S1 Elemental percentage of the snowflake-shaped ZnO@SiO_2@Fe_3O_4/C composites.

Element	Weight (%)	Atomic (%)
C	26.58	41.98
O	35.07	41.57
Si	12.37	8.35
Fe	10.43	3.54
Cu	5.61	1.67
Zn	9.94	2.88
Totals	100.00	100.00

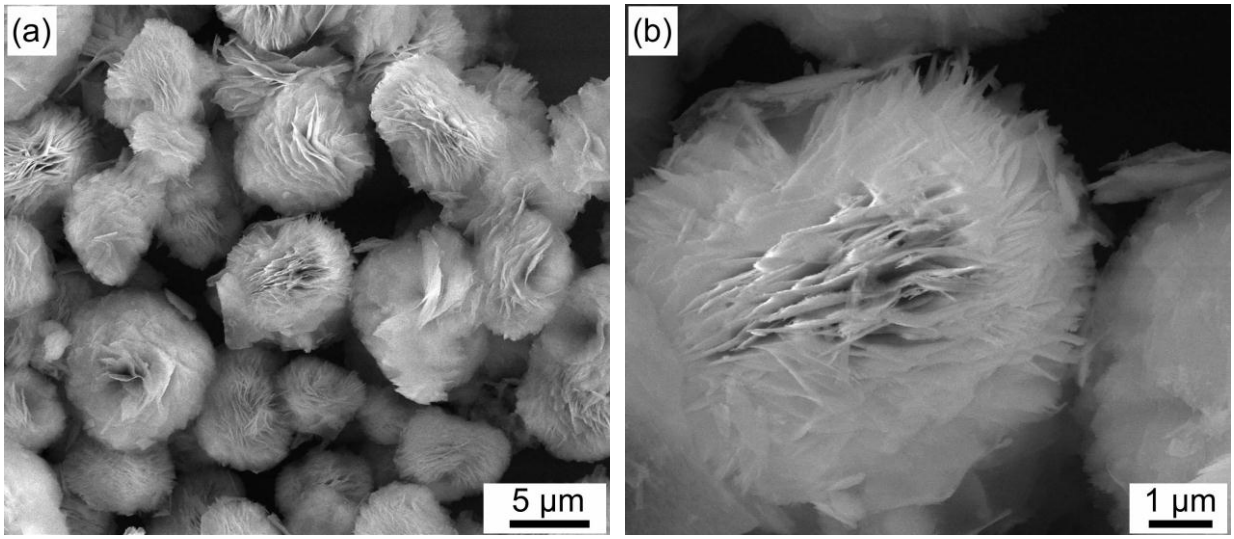

Fig. S4 (a) Low- and (b) high-magnification FESEM images of the $ZnO@SiO_2@Fe_3O_4/C$ microspheres.

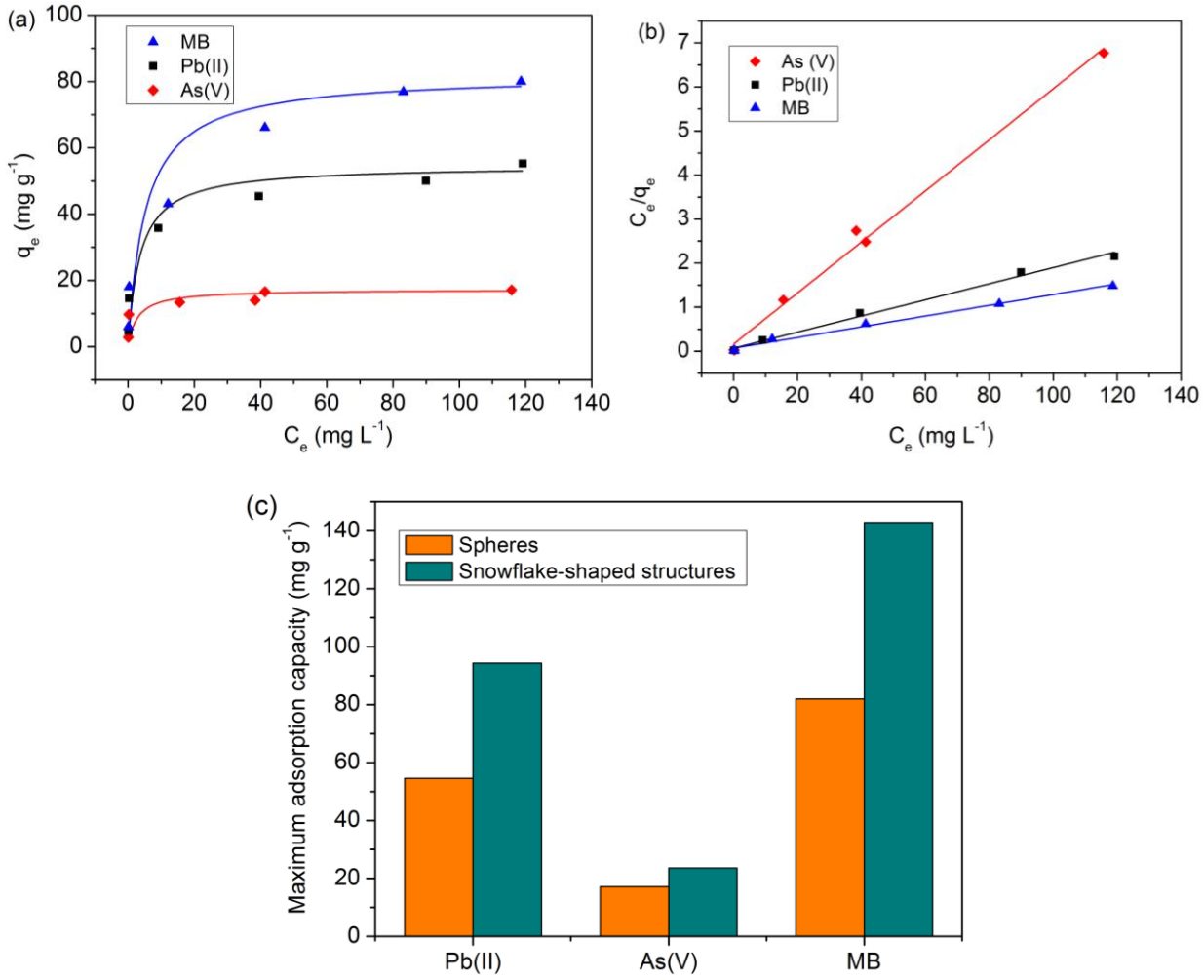

Fig. S5 (a) Adsorption isotherms of the ZnO@SiO_2@Fe_3O_4/C microspheres towards Pb(II), As(V), and MB (the lines stand for the results fitted from Langmuir isotherm model); (b) the linearized fits based on Langmuir adsorption model. Pb(II): y=0.0183x+0.0657 R^2=0.9922, As(V): y=0.0580x+0.1593 R^2=0.9925, MB: y=0.0122x+0.0647 R^2=0.9905; (c) comparison on the maximum adsorption capacity between snowflake-shaped structures and spheres.

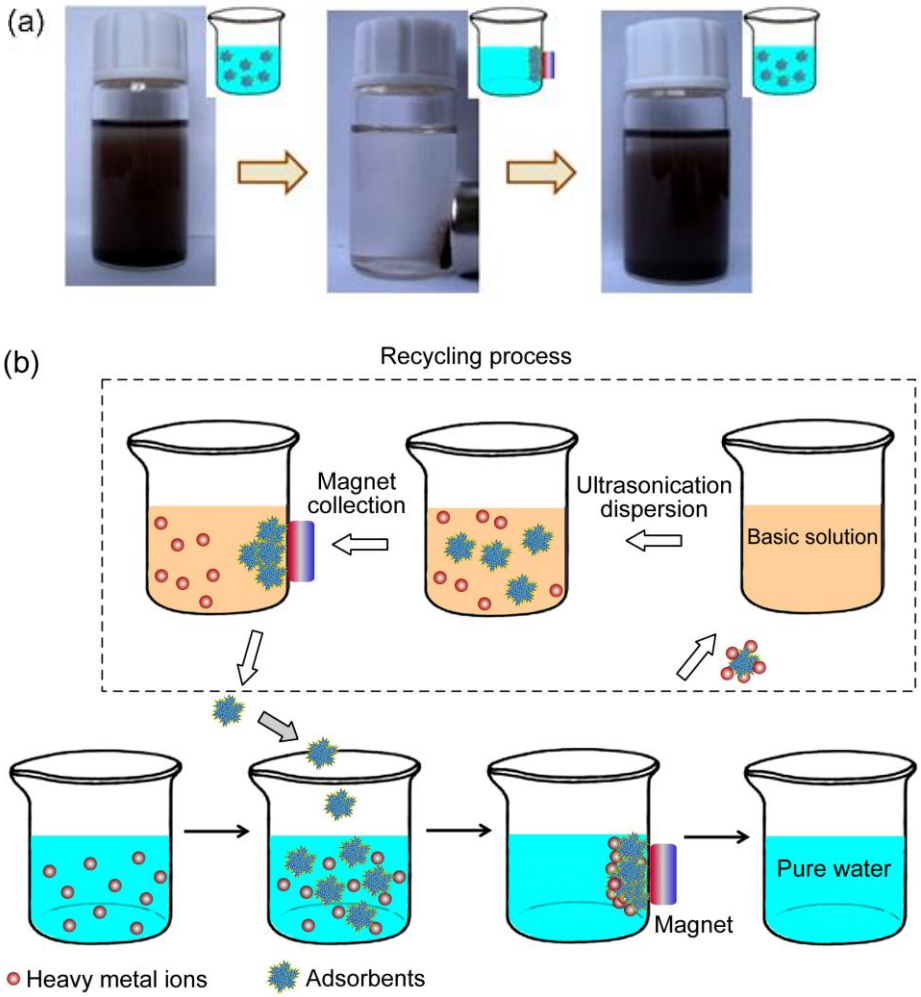

Fig. S6 Illustration for the recycling usage of the magnetic $ZnO@SiO_2@Fe_3O_4/C$ micro/nanostructures: (a) real photos of magnet collection and re-dispersion; (b) the whole recycling process.