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Selective recognition of perfluorinated compounds with functional core-shell magnetic nanomaterial

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Perfluorinated compounds (PFCs) include a large group of man-made chemicals characterized by a fully fluorinated alkyl chain attached with different hydrophilic functional groups (carboxyl or sulfonate group). In recent years, PFCs have been recognized as emerging organic pollutants mainly due to their global distribution, environmental persistence, bioaccumulative ability and potential hazard to human beings. Until now, several adsorptive materials (e.g. crosslinked chitosan beads, anion exchange resins) have been synthesized as effective adsorbents for removal of PFCs from a variety of water samples. However, these materials all have shortcomings and the novel adsorbents with more efficiency for PFCs removal are still required. In this study, functional magnetic nanomaterial, namely $\text{Fe}_3\text{O}_4@\text{SiO}_2/\text{APTES}\&\text{PFOTES}$, was prepared by a modified Stober method. using poly(acrylic acid)-modified Fe_3O_4 nanoparticles as support substrate, (3-aminopropyl)triethoxysilane (APTES) and 1H,1H,2H,2H-perfluorooctyltriethoxysilane (PFOTES) as functional monomers, core-shell structured $\text{Fe}_3\text{O}_4@\text{SiO}_2/\text{APTES}\&\text{PFOTES}$ was obtained. Fluorine-fluorine interaction and electrostatic attraction were the two major acting forces for PFCs recognition and $\text{Fe}_3\text{O}_4@\text{SiO}_2/\text{APTES}\&\text{PFOTES}$ exhibited much higher adsorption amounts for PFCs than the other reference compounds. As the following study, $\text{Fe}_3\text{O}_4@\text{SiO}_2/\text{APTES}\&\text{PFOTES}$ will be applied for selective removal of PFCs in environmental, biological and foodstuff samples.

Biography

Yusun Zhou is pursuing on his doctorate in Tongji Medical College of Huazhong University of Science and Technology, China. His research is supervised by Professor Surong Mei and supported by several project funds. His research interest is to prepare functional materials and apply them in the field of environmental and biological science.

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