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Preparation, characterization, and application of multiple stimuli-responsive rattle-type magnetic hollow molecular imprinted poly (ionic liquids) nanospheres ($\text{Fe}_3\text{O}_4@\text{void@PILMIP}$) for specific recognition of protein

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Abstract: For specific recognition of protein, novel rattle-type magnetic hollow molecular imprinted poly (ionic liquids) nanospheres have been prepared, and bovine serum albumin was selected as the model protein. The rattle-type magnetic $\text{Fe}_3\text{O}_4@\text{void@PILMIP}$ nanospheres were synthesized by the hard templating method, and characterized by SEM, TEM, FTIR, TGA, and VSM. The as-prepared $\text{Fe}_3\text{O}_4@\text{void@PILMIP}$ nanospheres could be responsive to external magnetic field, environmental temperature and pH. The results of adsorption isotherm and kinetics showed that the $\text{Fe}_3\text{O}_4@\text{void@PILMIP}$ nanospheres possessed good recognition and high adsorption capacity of bovine serum albumin. The selective and competitive recognition experiments indicated that the $\text{Fe}_3\text{O}_4@\text{void@PILMIP}$ nanospheres could selectively recognize bovine serum albumin compared with other proteins (bovine hemoglobin, ovalbumin and lysozyme).

Keywords: Rattle-type structure; Ionic liquid; Molecular imprinted polymer; Protein; Multiple stimuli-responsive.

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