Zhoucheng Wang, Chem Sci J 2018, Volume 9
DOI: 10.4172/2150-3494-C2-021

Adsorption of BSA on amino-modified silica-coated magnetic $MnFe_2O_4$ nanoparticles

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Magnetic nanoparticles (MNPs) have drawn a lot of attention because of their unique properties and potential applications such as the immobilization of proteins and enzymes, drug delivery, etc. However, for bio-related applications, the pure magnetic particles might have the problems associated with the formation of large aggregates, alteration of magnetic properties and their toxicity in the biological system. Therefore, it would be necessary to coat a protective layer to ensure their chemical stability and improve their biocompatibility. Silica was considered to be one of the most ideal coating layers for MNPs due to its reliable chemical stability, biocompatibility, and easy functionalization, making them suitable for conjugation with proteins and *in vivo* applications. Many research have done on the silica-coated magnetic nanoparticles (SMNPs) resent years. Up to now, those studies mainly focused on the magnetite Fe_3O_4. $MnFe_2O_4$ nanoparticles supposed to be a better material for application due to its higher mass magnetisation and magnetic susceptibility. In this work, the superparamagnetic amino-modified silica-coated magnetic $MnFe_2O_4$ nanoparticles (AS-MNPs) have been successfully synthesized to adsorb bovine serum albumin (BSA). Comparing with SMNPs, AS-MNPs supposed to facilitate a strong attachment of protein onto its surface due to their additional surface amino groups. The pH and ionic strength effect on the adsorption of BSA were investigated, and isothermal adsorption of BSA on the nanoparticles was carried out by placing AS-MNPs into different batches of BSA solutions at pH 5.1. As a result, a high loading of BSA of 0.159 mg/g can be anchored on the AS-MNPs.

Biography

Zhoucheng Wang has completed his PhD from Xiamen University in 1997. He is a professor of the college of chemistry and chemical engineering at Xiamen University since 2006. His research interests concern synthesis and characterization of nano-composite materials and multi-layer coatings, materials electrochemistry and surface engineering. He has published more than 120 papers in reputed journals.

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