Immobilization of protein on amino-silane modified silica-coated Fe_3O_4 nanoparticles

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Fe_3O_4 core particles with a size of 9 nm were prepared by co-precipitation of Fe^{3+}, Fe^{2+} and NH_4OH, and then silica coated on the surface of the Fe_3O_4 nanoparticles by the hydrolysis of TEOS. The thickness of coated silica particles can be controlled by changing the experimental parameters. 3-APTES was covalently coupled to the surface of the magnetic silica nanoparticles. Bovine serum albumin (BSA) was covalently immobilization onto the amino-silane modified magnetic silica supports by the glutaraldehyde method. The mopology, particle size, and magnetic properties of silica-coated Fe_3O_4 nanoparticles were characterized bt TEM, DLS and VSM. As a results, silica-coated Fe_3O_4 nanoparticles have an average particle size of 15 nm were obtained and superparamagnetic properties of the nanoparticles were found out. In addition, the analysis of X-ray diffraction measurements showed that the structure of the nanoparticles were spinel type. The results shows that such amino-silane modified magnetic silica is a effective superparamagnetic supports for bioseparation and the maximum BSA immobilization capacity (up to 35mg/g) was obtained 0.1M phosphate buffer at pH 5.0.