

Adsorption and Release Properties of Bovine Serum Albumin on Functionalized SBA-15 for Controlled Drug Delivery

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Recently, mesoporous materials including MCM-41, MCM-48 and SBA-15, have been used in a variety of applications such as catalysis, chemical sensing, and adsorption due to their ordered hexagonal pore structure, very large pore size and high surface area. Especially, SBA-15 is a very excellent candidate for drug delivery system because its pore size is easy to be controlled according to the synthesis conditions of aging temperature and time, and the presence of swelling agent. In this study, adsorption equilibrium and release studies of bovine serum albumin (BSA) as a model protein were carried out in terms of temperature and pH. Contrary to our expectation, adsorption capacity increases with temperature regardless of the pore size of SBA-15 samples. The incorporation of functional group on SBA-15 surface is very useful to adjust the adsorption and release properties for drug delivery system due to the strong electrostatic interaction between the host and the guest according to the temperature and the pH of solution. To verify their properties, SBA-15 samples were functionalized through postsynthesis by grafting amine group.