

Separation Properties of Bovine Serum Albumin on Surface Modified Mesoporous SBA-15

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Recently, SBA-15 has 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. In our study, SBA-15 was used as a very excellent candidate for separation large pore size of biochemicals, such as bovine serum albumin. Its pore size was enlarged by increasing the amount of swelling agent, mesitylene, aging temperature, and prolonging aging time. Furthermore, the surface of mesoporous SBA-15 could be modified by employing not only primary amine group but also second amine group. It was found that the separation ability of the latter sample was better than that of the former due to higher nitrogen content and stronger affinity of adsorption. Release studies were carried out in the range of pH from neutral to basic solution on amine-modified samples. In addition, the adsorption mechanism was investigated by employing the pseudo-first order, pseudo-second order, and intraparticle diffusion models. The samples were characterized by X-ray diffraction (XRD), nitrogen adsorption and desorption analyses, scanning electron microscope (SEM), transmission electron microscopy (TEM), and Fourier Transform Infrared (FT-IR).