

Study on Adsorption of Sodium Dodecylbenzenesulfonate by Using Amino Group-substituted Mesoporous Silica Nanoparticles

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Since radioactive waste is very harmful to human health and the environment, much attention has been paid to the removal of radioactive materials. Surfactants have been used for removal of radioactive atoms. Many liquid radioactive wastes, which generally contain such surfactants, are generated through this decontamination. The liquid radioactive waste treatment process can be a more efficient process through the removal of surfactants such as sodium dodecylbenzenesulfonate (SDBS). Mesoporous silica nanoparticle (MSN) has attracted a great deal of interest from researchers as biomedicine, biosensing, drug delivery materials. MSN has a particularly large surface area and high pore volume, uniform pore size distribution, ease of surface modification to internal pores or external particle surfaces. Due to these characteristics, MSN has the advantage of adsorbing a large amount of materials inside. In this study, we experimented to adsorb the surfactant SDBS using MSN. MSN was prepared through a modified sol-gel process and then functionalized with amino groups on the surface and inside of MSN using (3-aminopropyl)triethoxysilane (MSN-NH₂). The SDBS adsorption concentration of MSN-NH₂ was calculated by SDBS concentration of the filtrate after MSN-NH₂ and SDBS agitation. The SDBS adsorption concentration of MSN-NH₂ was measured by using different initial SDBS concentration, MSN-NH₂ concentration and reaction time as variables. Also, the concentration of SDBS adsorption of MSN-NH₂ was measured using a mixture of SDBS and Cs⁺ ions.