



Immobilization of 2-(2-hydroxybenzylidinoamino) pyridin-3-ol on silica gel and application to industrial wastewater

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ABSTRACT

In this study, first silica gel surface was activated. The compound (3-Chloropropyl)triethoxysilane (CPTS) was immobilized on the modified SiO₂ surface. 2-(2-Hydroxybenzylidinoamino) pyridin-3-ol (HBAP) compound was covalently immobilized on the modified silica gel compound (Si-CPTS). The newly prepared Si-CPTS-HBAP was characterized with a variety of techniques, including Fourier transform infrared spectroscopy and scanning electron microscopy. Batch method was used for the adsorption study of Cr(III) ions. The amount of adsorption of Cr(III) ions was controlled and detected by ultraviolet-visible spectrophotometer. The influences of concentration, temperature, contact time, and pH on the adsorption of Si-CPTS-HBAP were investigated. The results were obtained by Langmuir, Freundlich, and Dubinin–Radushkevich isotherm equations. In addition, thermodynamic parameters such as free energy (ΔH°), entropy (ΔS°), and enthalpy (ΔG°) were calculated from the sorption results and used to explain the adsorption mechanism. The optimum values obtained from this study are 6, 120 min, 0.05 g, and 303.15 K for pH, interaction time, adsorbent amount, and temperature, respectively. The results indicate that this adsorbent can successfully be employed in the separation of Cr(III) from aqueous solutions.

Keywords: Silica gel; Heavy metal; Immobilization; Adsorption

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