DEVELOPMENT OF CHITOSAN/ CU(OH)2 AND CHITOSAN/ CUO SORBENTS FOR EFFICIENT ARSENIC REMOVAL FROM AQUEOUS SOLUTION

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ABSTRACT

The removal of As(V) ions from aqueous solution was carried out by using composite sorbents based on chitosan (as the encapsulating material) and Cu(OH)2 or CuO to manufacture [Chitosan/Cu(OH)2] and [Chitosan/CuO], respectively. The sorbents was characterized using SEM, EDX and Zeta potential analysis. Sorption uptake was highly dependent on pH, temperature, initial As (V) concentration and sorbent mass: The optimum pH for arsenic removal being close to 4. The sorption isotherm can be described by Langmuir sorption isotherm. This means that the metal ion can be bound through two different sorption sites: one having a strong affinity for As (V) (probably Cu(OH)2 or CuO), the other having a lower affinity (probably the encapsulating material). The uptake kinetics was highly fitted with the pseudo-second order rate equation. The effect of temperature was also evaluated, verifying the endothermic nature of the adsorption process. Arsenic elution was performed using a saline solution (30 g/L NaCl) with the pH set to 12 with NaOH. The recycling of the sorbent was tested, maintaining a removal efficiency and a metal recovery over 95% for five successive sorption/desorption cycles.

Keywords: *Arsenic; chitosan; copper hydroxide; copper oxide; removal; kinetics; adsorption isotherms.*