

Sorption Efficiency of a New Sorbent towards Cadmium(II): Methylphosphonic Acid Grafted Polystyrene Resin

Auteur: Ferrah, Nacer; Abderrahim, Omar; Didi, Mohamed Amine; Villemin, Didier

Abstract/Résumé : A new chelating polymeric sorbent has been developed using polystyrene resin grafted with phosphonic acid. After characterization by FTIR and elementary analysis, the new resin has been investigated in liquid-solid extraction of cadmium(II). The results indicated that phosphonic resin could adsorb Cd(II) ion effectively from aqueous solution. The adsorption was strongly dependent on the pH of the medium and the optimum pH value level for better sorption was between 3.2 and 5.2. The influence of other analytical parameters including contact time, amount of resin, metal ion concentration, and the presence of some electrolytes was investigated. The maximum uptake capacity of Cd(II) ions was 37,9 mg.g(-1) grafted resin at ambient temperature, at an initial pH value of 5.0. The overall adsorption process was best described by pseudo second-order kinetic. When Freundlich and Langmuir isotherms were tested, the latter had a better fit with the experimental data. Furthermore, more than 92% of Cd(II) could be eluted by using 1.0 mol.L-1 HCl in one cycle.

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