

Modification of malonamide ion-exchange/chelating resins using the Fields-Kabatschnik reaction and their application to metal ion removal from aqueous solutions.

Autorzy

Andrzej W. Trochimczuk

Julia Jezierska

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Streszczenie

A resin containing 2-aminoethyl-substituted amides of malonic acid was modified in the Fields–Kabatschnik reaction using diethyl phosphite. The resultant ion-exchange/chelating resins have aminomethylphosphonate groups. Modification proceeds almost quantitatively, giving a resin with $P=1.97$ mmol/g, $N=4.20$ mmol/g, and water regain of 0.44 g/g. It can be selectively hydrolyzed by treatment with trimethylchlorosilane/potassium bromide in dry acetonitrile. Both acidic and ester forms of the resin were used in the removal of Cu(II), Cd(II), Ni(II), and Zn(II) from their diluted 1×10^{-4} N solutions in 0.2 M acetate buffer at pH 3.7 and 5.6. The affinity of the resin in an acid form toward divalent metal cations is high, and at pH 5.6 the $\log K_d$ is 7.54, 3.97, 3.41, and 3.98, respectively. The resins are selective and the presence of an excess of sodium ions does not influence the uptake of metal ions. The type of complexes formed between the resins and Cu(II) ions was studied using EPR spectroscopy. The ester form of the resin was used in the removal of tetrachloroaurate anions from hydrochloric acid solution. It has been found that the $\log K_d$ is in the range of 3.14–3.94 for the uptake of $AuCl_4^-$ from 5.0–0.5 M HCl solutions.

Adres publiczny

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<http://link.springer.com>