Chelation ion-exchange properties of copolymer resin derived from 2, 2´-dihydroxybiphenyl, biuret, and formaldehyde

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ABSTRACT

Copolymers (2, 2´-dihydroxybiphenyl, biuret and formaldehyde, [2, 2´-HBBF]) were (2, 2´-dihydroxybiphenyl-biuret-formaldehyde) prepared by the condensation of 2, 2´-dihydroxybiphenyl and biuret with formaldehyde in the presence of acid as a catalyst and using different molar proportions of monomers. The resulting copolymers were characterized by infrared, UV-visible and proton NMR spectroscopy. Average molecular weight was determined by conductometric titration in non-aqueous medium. The viscosity measurements carried out in DMF N,N' Dimethylformamide indicate normal behavior. A copolymer proved to be a selective chelating ion-exchange copolymer for certain ions. Chelating ion-exchange properties of this copolymer were studied for Cu²⁺, Ni²⁺, Co²⁺, Fe³⁺, and Zn²⁺ ions. A batch equilibrium method was employed in the study of the selectivity of metal ion uptake, involving the measurements of the distribution of a given metal ion between the polymer sample and a solution containing the metal ion. The study was carried out over a wide pH range and in media of various ionic strengths. The copolymer showed a higher selectivity for Fe³⁺ and Cu²⁺ ions than for Ni²⁺, Zn²⁺, and Co²⁺ ions.

Keywords: Synthesis; Ion-exchange; Distribution ratio; Resin; Polycondensation; Chelating resin

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