

Ion-Imprinted Interpenetrating Polymer Networks for Preconcentration and Determination of Cd(II) by Flame Atomic Absorption Spectrometry

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A Cd(II)-imprinted interpenetrating polymer network (IPN) containing epoxy resin, triethylenetetramine and cadmium methacrylate-acrylamide- N,N' -methylene-bis-(acrylamide) has been synthesized. IPN was prepared by *in-situ* sequential polymerization. First polymer network was obtained by gelation of epoxy resin and triethylenetetramine at 30°C. Second polymer network was obtained by radical co-polymerization of cadmium methacrylate, acrylamide and N,N' -methylene-bis-(acrylamide) at 60°C. Excessive Cd(II) ion was removed with 0.5 mol L⁻¹ HNO₃ and finally a Cd(II)-imprinted IPN sorbent was obtained. Coordination between Cd(II) and functional groups of IPN was primarily investigated on the basis of FT-IR spectra. Adsorption-desorption characteristics of IPN as a highly selective adsorbent for solid-phase extraction (SPE) and preconcentration for Cd(II) in aqueous solutions were investigated in details. Experimental results have shown that trace Cd(II) ion can be recovered almost quantitatively (95% yield) at pH 5.0. The maximum static adsorption capacity of the ion-imprinted adsorbent was 105.7 μmol g⁻¹. Compared to the non-imprinted IPN, the imprinted one has higher adsorption capacity and selectivity towards Cd(II). Moreover, Cd(II)-imprinted IPN exhibits superior reusability and stability. Precision of the method for a standard was 3.2% (RSD, n = 11). The prepared ion-imprinted IPN adsorbent was successfully applied to the analysis of two natural water samples.