



Synthesis and application of alizarin complexone functionalized polyurethane foam: Preconcentration/separation of metal ions from tap water and human urine

Journal of Hazardous Materials Volume 182, Issues 1–3, 15 October 2010, Pages 286–294

S.M. Abdel Azeem, **W.A.A. Arafa**, M.F. El-Shahat

- ^a Chemistry Department, Faculty of Science, Fayoum University, Egypt
- ^b Chemistry Department, Faculty of Science, Ain-Shams University, Egypt

Abstract

A new chelating sorbent has been synthesized by the covalent condensation of alizarin complexone (ALC) to polyurethane foam (PUF) through $-N=C-$ group. The material was characterized by IR, 1H NMR and chemical proof. Iminodiacetic acid groups are found in the prepared sorbent and the reaction proceeded via condensation between the toluidine moieties in the PUF and non-hydrogen bonded carbonyl group in ALC. Also, the possibility of elimination reaction between the groups (NH_2 , NH and OH) in the polymer and carboxylic groups in the reagent was excluded. The material has been used to separate/preconcentrate Cu^{2+} , Zn^{2+} and Cd^{2+} prior to their determination by flame atomic absorption spectrometry (FAAS). Chemical and flow variables such as sample pH, sorbent capacity, sample flow rate and interference from co-existing ions were investigated. All metal ions are quantitatively desorbed by 0.1 mol L^{-1} nitric acid solution. The procedure provides concentration factor 100 and limits of detection $0.013 \mu\text{g mL}^{-1}$. The method was validated by the analysis of certified reference materials and real samples such as tap water and human urine.