

Reversed Phase Partition Chromatographic Separation of Gd(III) From Hippuric Acid on Poly[Dibenzo-18-Crown-6]

Abstract

A simple method has been developed for the separation of Gd(III) in hippuric acid medium by using poly[dibenzo-18-crown-6] as stationary phase. The effect of hippuric acid concentration, different eluting agent, foreign ions etc. was studied and the optimum conditions were established. Breakthrough capacity of poly [dibenzo-18-crown-6] for Gd(III) was found to be 0.572 ± 0.01 mmol/g of crown polymer. The separation of Gd(III) from other elements in multicomponent mixtures has been achieved. The method was extended for determination of Gd(III) in real sample. The method is simple, rapid and selective with good reproducibility (approximately $\pm 2\%$).

Introduction:

Extraction and preconcentration of these valuable metal ions from other session products is extremely important not only from the point of view of their limited resource availability, but also to reduce their quantum for disposal as radioactive wastes. Various methods were adopted for separation of lanthanides and actinides, which include precipitation and co-precipitation and ion exchange chromatography systems [6]. But over the years extraction chromatography (EC) has been proved to be promising in this aspect because of simple operation. Macrocyclic polyethers generally called as "crown ethers" have gained attention due to their special selectivity arising presumably from their ring-size comparable with the ionic radii of certain alkali metals [7–11]. The resistance to certain chemicals like organic solvents e.g. acetone, alcohols, chloroform as well as mineral acids like hydrochloric, sulfuric, bromic acid by poly[dibenzo-18-crown-6] could potentially be advantageous with respect to the sorption of various cations using column chromatography. Crown ethers are widely popular and used as complexing agents that can selectively capture certain metal cations in their cavity based on their size. This special chemical property exhibited by poly [dibenzo-18-crown-6] has been continuously explored in our laboratory for selective cation exchanger by column chromatography. To our knowledge, no successful attempts were reported in the literature for the separation of Gd (III) using hippuric acid media and column chromatography. The present communication describes a simple and sensitive method for