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SOLVENT EXTRACTION SEPARATION OF URANIUM (VI) WITH ACETATECALIX[N]ARENE.

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The selective extraction of uranium has attracted extensive attention from chemists because of its importance in relation to energy problems. In orther to design a ligand that can selectively extract uranyl ions (UO_2^{2+}), one has to overcome a difficult problem that is, the ligand must discriminate strictly between UO_2^{2+} and other metal ions present in great excess in sea water. A possibly unique solution to this difficult problem is provide be the unusual coordination structure of UO_2^{2+} complexes which require either a pseudoplanar pentacoordinate or hexacoordinate structure. This suggest that a macrocyclic host molecule having a nearly coplanar arrangement of either five or six ligand groups would act as a specific ligand for UO_2^{2+} (i.e. as uranophile).

Acetatecalix[n]arene-based uranophiles bearing acetate group on the lower rim have been synthesized and the extractability (%E) and the selectivity towards uranyl ion (UO_2^{2+}) estimated in a two phase (acetate - toluene) solvent extraction system. %E for acetatecalix [n]arene increases from pH2 and saturation is reached at around pH 6-7 where more than 90% extractability occurs. Extraction of UO_2^{2+} from aqueous acetate solution established that the hexaacetatecalix[6]arene in organic phase can compete efficiently with Ac^- ions in the aqueous phase for UO_2^{2+} whereas in tetraacetatecalix[4]arene as a uranophile.

We also found that the selectivity of acetatecalix[n]arene is superior top-tec-butyl calix[n]arene. The results shown that hexaacetate calix[6]arene serve as an excellent UO_2^{2+} selective extraction reagent.

CNPq/FAPESP.

Rare Earth Congress 98, 1998 Fremantle, Austrália

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