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Liquid extraction of some rare earth elements with aminomethylphosphine oxides

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Abstract

Methods were developed of the solvent extraction from aqueous solutions of hydrochloric, nitric, and perchloric acids of the triply charged ions of rare earth elements including samarium, lutetium, dysprosium, neodymium, and ytterbium, using as reagents the lipophilic aminomethylphosphine oxides containing two or four dialkylphosphinyl groups, and toluene, chloroform, and methylene chloride as the organic media. The study of the effect of concentration of mineral acids on the degree of metal extraction showed that the highest extraction efficiency of lanthanides is achieved with bis(dihexylphosphinylmethyl)octylamine (I) from perchloric media: extraction degree 80%, whereas extraction from the solutions in two other acids did not exceed 30%. It was shown that the highest selectivity was reached at the extraction of scandium in all the extraction systems. A possible mechanism of extraction is discussed.

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