

Extractive Separation of Trivalent Rare Earth Metal Ions with Phenylphosphoric Acid Type of Trident Molecule for Rare Metal Recovery

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Phenylphosphoric acid type of tripodal compound has been prepared to investigate extraction of trivalent rare earth metal ions. The elution of the compound into aqueous solution was suppressed compared with the corresponding ethyl derivative probably due to bulky phenyl groups. It exhibited extremely high extraction ability to trivalent rare earths due to converging and complementary effects of three phosphoric acid groups. Such high ability may lead poor intragroup separation efficiency of rare earth metal ions. The result for 2 : 1 stoichiometry of tripodal reagent to heavy rare earths did not mention the inflexion point in the lanthanoid series. The extraction reactions were determined for all rare earths examined. The extraction equilibrium constants (K_{ex}), the separation factors (β), half pH values ($pH_{1/2}$), difference half pH values ($\Delta pH_{1/2}$) for REs extraction with reagent were estimated and were compared with the ethylphosphoric acid derivative previously investigated. The stripping test of the loaded rare earth ions from the reagent was also investigated.

Keywords : Tripodal compound, Solvent extraction, Rare earth metals