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Separation of cerium from other rare earth elements by solvent extraction

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This work presents an investigation of solvent extraction parameters to obtain high purity cerium from a mixture containing other rare earths elements, in alternative to the oxidation and selective precipitation or dissolution. The study was carried using a sample of a sulphuric liquor obtained from monazite leaching rich in light rare earth elements (La, Ce, Pr, Ne) provided by INB (Indústrias Nucleares do Brasil). Tests were realized in chloridric, nitric and sulfuric medium. For the experiments in nitric and chloridric medium, the rare earth elements from the liquor were precipitated in rare earths oxalate form, precipitated and then dissolved in the respective medium. The parameters investigated were: Type and concentration of oxidant agent, type and concentration of extractant, liquor acidity and volumetric ratio between organic and aqueous phases. Preference of the organic phase to extract cerium in its oxidase form (IV) above the other rare earths elements, allowing the obtainment of a high purity cerium solution was confirmed. Best results were achieved in nitric medium, P507® as extractant and a mixture of potassium persulfate and silver chloride as oxidant agents, yielding over 98% cerium extraction with over 99% of purity.

Biography

Carlos Antonio de Morais has a BS degree in Chemistry from UFMG (graduated in 1990) and PhD in Metallurgical Engineering and Mining, also from UFMG in 2002. He is a CNPq researcher level 2 and Researcher in CDTN-Nuclear Technology Development Center, an agency belonging to the CNEN (National Nuclear Energy Commission) since 1990. He operates in the development, optimization and application of hydrometallurgical processes, using mainly leaching techniques, solvent extraction and chemical precipitation.

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