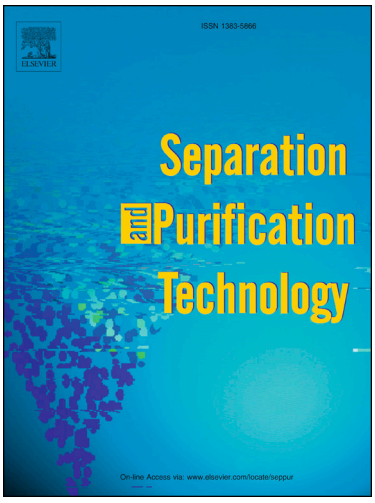

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Separation Process of Dysprosium and Neodymium from Waste Neodymium Magnet

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Abstract

Separation of neodymium (Nd^{3+}), praseodymium (Pr^{3+}), and dysprosium (Dy^{3+}) from a waste Nd magnet has been investigated using a solvent-impregnated resin (SIR) containing 2-ethylhexylphosphonic acid mono-2-ethylhexyl ester coated with polyvinyl alcohol crosslinked by glutaraldehyde. A large amount of the iron (Fe^{3+}) contained in the Nd magnet was completely separated from the rare earth metals by adding oxalic acid. Rare earth metal oxides were then prepared by calcining the rare earth metal oxalate precipitates. Separation of Dy^{3+} and Nd^{3+}/Pr^{3+} was performed from nitrate media containing the rare earths oxides using a chromatographic separation system combined with frontal adsorption, scrubbing, and elution. Complete separation of Dy^{3+} was achieved and the effluent containing Nd^{3+} and Pr^{3+} was collected. Finally, separation of Nd^{3+}/Pr^{3+} was performed using the same chromatographic separation system to obtain 91.0% purity Nd^{3+}.

Keywords: Solvent impregnated resin, Separation, Rare earth metal

1. Introduction

Rare earth metals (REMs) are critical metals for recent advanced technologies, and