

Extraction of light, medium and heavy rare-earth elements using synergist extractants developed from ionic liquid and conventional extractants

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ABSTRACT

This study focuses on the extraction of rare-earth elements (REE) using eight newly formulated synergist extractants and the performance was compared with that using the conventional extractants. Extraction was conducted on selected REE namely praseodymium (Pr), gadolinium (Gd) and dysprosium (Dy) representing light, medium and heavy REE, respectively. The synergist extractant of A336-[C2mim][NTf2] appeared to be the most positive synergist extractant, especially in the extraction of Pr and Dy based on a 90% increase in the extraction efficiency compared to the conventional extractant of A336. Apparently, the presence of the ionic liquid [C2mim][NTf2] in the synergist extractant altered the anion exchanger of A336 and successfully formulated extractant with a high extraction efficiency. The characterisation studies of A336-[C2mim][NTf2] show the synergist compatibility between A336 and [C2mim][NTf2]. Apparently, not all synergist extractants could elevate the extraction potential until conducting a sequence of tests.

KEYWORDS

Solvent extraction; Rare-earth elements; Ionic liquid; Synergist extractant; Organic solvent

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