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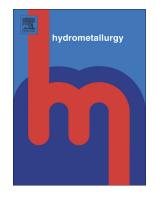
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Liquid-liquid extraction of lithium using novel phosphonium ionic

liquid as an extractant

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Abstract

tetrabutylphosphonium phosphonium liquid (IL), A novel ionic

bis(2,4,4-trimethylpentyl)phosphinate([P₄₄₄₄][BTMPP]), prepared and

characterized by NMR spectroscopy. The solvent extraction behavior of lithium from

aqueous solution by this IL in toluene was investigated. The extraction behavior was

carried out as a function of various parameters such as aqueous acidity, temperature

and extractant concentration. The extraction efficiencies obtained in [P₄₄₄₄][BTMPP]

were compared with those observed in molecular extractant bis(2,4,4-trimethylpentyl)

phosphinic acid (HBTMPP), from which the anion of the ionic liquid extractant was

prepared. The extraction efficiency for extraction of lithium by [P₄₄₄₄][BTMPP] was

much higher than that for extraction by HBTMPP. The extracted species were

ascertained from slop analysis method which indicated 1:1 (metal: ligand) ratio in the

complex. In addition, the effects of thermodynamic parameters, the stripping of

lithium from the ionic liquid, and the reusability of the phosphonium ionic liquid were

studied in detail.

Keywords: Lithium; Solvent extraction; Ionic liquid

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