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[\[PDF \(558K\)\]](#) [\[References\]](#)**Synergistic Effect of 18-Crown-6 Derivatives on Chelate Extraction of Lanthanoids(III) into an Ionic Liquid with 2-Thenoyltrifluoroacetone**[Hiroyuki OKAMURA](#)¹⁾²⁾, [Naoki HIRAYAMA](#)¹⁾³⁾, [Kotaro MORITA](#)³⁾, [Kojiro SHIMOJO](#)²⁾, [Hirochika NAGANAWA](#)²⁾ and [Hisanori IMURA](#)³⁾*1) Division of Material Chemistry, Graduate School of Natural Science and Technology, Kanazawa University**2) Division of Environment and Radiation Sciences, Nuclear Science and Engineering Directorate, Japan Atomic Energy Agency**3) Division of Material Sciences, Graduate School of Natural Science and Technology, Kanazawa University***(Received January 5, 2010)****(Accepted March 23, 2010)**

The synergistic effect of 18-crown-6 derivatives, such as 18-crown-6 (18C6), *cis*-dicyclohexano-18-crown-6 (DC18C6) and dibenzo-18-crown-6 (DB18C6), on the extraction of trivalent lanthanoids (Ln^{3+}) into an ionic liquid, 1-butyl-3-methylimidazolium bis(trifluoromethanesulfonyl)imide, with 2-thenoyltrifluoroacetone (Htta) was investigated. The extractability of lighter Ln^{3+} was enhanced by adding 18C6 or DC18C6, whereas no enhancement of the extractability was observed by adding DB18C6. Moreover, the synergistic effect by the crown ether (CE) was increased along with the decrease in the atomic number of Ln. In the synergistic extraction system, Ln^{3+} was extracted as cationic ternary complexes $\text{Ln}(\text{tta})_2(\text{CE})^+$ and $\text{Ln}(\text{tta})(\text{CE})^{2+}$, and it was suggested that the formation of the $\text{Ln}(\text{tta})(\text{CE})^{2+}$ complex as an extracted species results in the large synergistic effect. This synergistic effect originated in a size-fitting effect of CE on complexation to Ln^{3+} .

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