

ABSTRACT

Extracting organic solvent from water are always become an interest in relevance industry. Liquid-liquid equilibria is one common type of separation process that is widely used industrially. In this study, two new protic ionic liquids *i.e.* bis-(2-ethylhexyl)ammonium tosylate and tris-(2-ethylhexyl)ammonium tosylate were synthesized and characterized to be used as an extractor to separate azeotropic mixture of water and isopropanol. The miscibility of protic ionic liquids with water and isopropanol generally increases upon heating, and both systems undergo an upper critical solution temperature (UCST) type phase transition. Minor changes on temperature were the parameter to control the phase separation. In order to understand more on the chemical activities during phase separation and phase miscibility, both ternary mixtures were analyzed using Proton Magnetic Nuclear Resonance (^1H NMR). The removal of hydrogen(s) attached to nitrogen of protic ionic liquid's cation was the driving force for phase separation. This has been observed on both ternary mixtures.

As an addition to this study, the compositions for protic ionic liquid, water and isopropanol in organic and aqueous rich phase were determined at phase separation temperature 293 – 315 K. The reported composition values indicated that bis-(2-ethylhexyl)ammonium tosylate were able to extract 60.97 % of isopropanol from water and tris-(2-ethylhexyl)ammonium tosylate successfully extracted 47.92 % of isopropanol. Hence, from these values, bis-(2-ethylhexyl)ammonium tosylate shows a better ability as an extractant compared to tris-(2-ethylhexyl)ammonium tosylate.