

Application of next generation eco-friendly materials in extraction to replace ionic liquids

시은진, 박병홍<sup>†</sup>, 이봉섭<sup>1</sup>  
한국교통대학교; <sup>1</sup>강원대학교  
(b.h.park@ut.ac.kr<sup>†</sup>)

Ethanol is an attractive alternative fuel because it is a renewable bio-based resource that can be used as fuel and gasoline oxygen additives. Therefore, economic production of ethanol is very important. However, the presence of azeotropic characteristics in the mixtures of alcohols and alkanes was frequently found, which cannot be separated by a simple distillation process. The separation of the solutions requires an advanced technology such as a liquid-liquid extraction process presenting energy efficient, economical and nontoxic features. As an extractant in the process, eco-friendly and inexpensive deep eutectic solvents (DESs) with chemical properties similar to ionic liquids have been found to solve the problem of separation of azeotropic mixtures. This study evaluated experimentally the possibility of extracting ethanol from azeotrope mixtures using choline chloride based DESs. In addition, the ethanol extraction distribution between the two phases was calculated by COSMO-SAC thermodynamic model.

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