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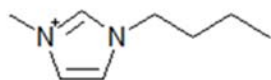
Co-extraction Behaviors of Dyes into an Ionic Liquid Phase Formed in an Aqueous Solution

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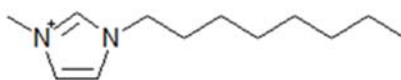
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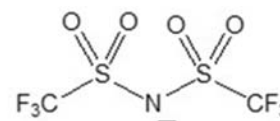
The extraction studies of chemical compounds into the ionic liquids (ILs) have been developed in this decade, because of the character of ILs such as vapourless and insoluble in water. However before the extraction, almost all ILs were synthesized and purified, and then, used as the liquid-liquid extraction media. In this study, the aqueous solutions of several kinds of imidazolium chloride and the lithium bis(trifluoromethanesulfonyl)imide (NTf₂) were examined to add to the aqueous solution of target compounds such as dyes, in order to form the ILs. Co-extraction behaviors of some dyes such as ethyl violet, rhodamine B and so on into ILs were examined.



[BMIm] ion



[OMIm] ion



[NTf₂] ion

In order to form an IL phase in the aqueous solution, the solution including the 0.1M (mol/L) 1-butyl-3-methylimidazolium (bmim) chloride solution, the 0.1 M lithium NTf₂ solution and the 5x10⁻⁶M dye was shaken with the mechanical shaker with 180spm, and then centrifuged with 2000rpm. ¹⁾As an IL phase appeared beneath the aqueous solution, it was collected and the concentrations of the dye in the aqueous and IL phases were determined spectrophotometrically. The volume of IL [bmim][NTf₂] formed in the 10mL of aqueous solution of 0.1M [bmim] ion and 0.1M NTf₂ ion was about 0.25mL.

The proposed method of the extraction of chemical species by means of forming the ionic liquid in the aqueous phase has some advantages over the usual ionic liquid extraction. It's possible to look for the appropriate combination of the cation and the anion of ionic liquid before preparing it. The coextraction behaviors of chemical species are depend on the structural affinity between the dyes and ILs. If the structure of cation have been changed to substitute the octyl group to butyl group in the bmim ion, some dyes which were not extracted with [bmim][NTf₂], were extracted well with octyl substituent IL [omim][NTf₂]. Furthermore, it would be possible to have specific groups in the IL to extract some species selectively. ²⁾

References

- (1) K Chayama, N Ooi, J Kawamura, M Toyama and S Iwatsuki, Proceeding of ISEC2017,20-27(2017)
- (2) K Chayama, Y Sano, S Iwatsuki, Anal. Sci., **31**, 1-3(2015)