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Development of new and more benign aqueous multiphase systems: the triple salting-out effect

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PURPOSE OF THE ABSTRACT

In 2012, Mace et al.[1] introduced the concept of aqueous multiphase systems (MuPS) - systems composed of three or more aqueous phases - by the combination of a large number of polymers and surfactants mixtures in aqueous solutions, and without volatile organic solvents employed. MuPS share all benign characteristics of the well-studied aqueous biphasic systems (ABS); yet, selective and improved separations of high-value compounds are better achieved in presence of more aqueous phases. To the best of our knowledge, MuPS formed by ionic liquids (ILs) and their possible applications were not explored up to date.

In this work, novel MuPS formed by quaternary mixtures composed of cholinium-based ILs, polymers, inorganic salts and water were investigated.[2] The influence of several ILs, salts and polymers was studied, demonstrating that a triple salting-out is the required phenomenon to prepare a MuPS. The respective phase diagrams which define the monophasic, biphasic and triphasic regions, and the "tie-surfaces", were determined, followed by the evaluation of the effect of temperature. Finally, it is shown the remarkable ability of IL-based MuPS to selectively separate a complex mixture of dyes.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

aqueous multiphase systems | ionic liquids | salting-out effect | selective separation

BIBLIOGRAPHY

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