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Self-Assembly and Electrostatic interactions in Deep Eutectic Solvents

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In recent years many studies into green solvents have been undertaken and deep eutectic solvents (DES) have emerged as environmentally friendly alternatives in many fields, such as separation processes, metal processing, biocatalysis and electrochemistry.[1] DES are solvents obtained through the complexation of organic compounds, where the interaction between the precursors promotes a depression in the melting point that allows the mixture to remain liquid at room temperature. Moreover, through different combinations of precursors the physicochemical properties of the solvent can be tuned for particular applications.
Research into DES has dramatically increased in volume and variety, especially in the last few years, as the advantages of DES in multiple processes becomes clear. Our recent studies have been focused on the ability of DES to sustain self-assembly of amphiphilic molecules. Such alternatives bring the possibility to develop new, sustainable alternatives for surfactant templating, drug delivery and preservation of bioactive molecules.

Our results provide a novel approach for aggregate manipulation in the absence of water through specific and non-specific ion interactions.[4,5] Small-angle neutron and X-ray scattering, in combination with other techniques, have been used to explore the bulk behaviour of these systems. Aiming to understand the fundamentals of amphiphile behaviour in these solvents, we will present details of self-assembly with varied physicochemical properties of the solvent, amphiphile characteristics and the effects of ion-ion interaction.

References

[1] E. L. Smith, A. P. Abbott and K. S. Ryder, Chem. Rev., 2014, 114, 11060-11082.
[2] T. Arnold, A. J. Jackson, A. Sanchez-Fernandez, D. Magnone, A. E. Terry and K. J. Edler, Langmuir, 2015, 31, 12894-12902.
[3] A. Sanchez-Fernandez, K. J. Edler, T. Arnold, D. Alba Venero and A. J. Jackson, Phys. Chem. Chem. Phys., 2017, 19, 8667-8670.
[4] A. Sanchez-Fernandez, T. Arnold, A. J. Jackson, S. L. Fussell, R. K. Heenan, R. A. Campbell and K. J. Edler, Phys. Chem. Chem. Phys., 2016, 18, 33240-33249.
[5] A. Sanchez-Fernandez, O. S. Hammond, A. J. Jackson, T. Arnold, J. Doutch and K. J. Edler, Langmuir, 2017, 33, 14304-14314.
[6] A. Sanchez-Fernandez, A. J. Jackson, S. F. Prévost, J. J. Doutch and K. J. Edler, J. Am. Chem. Soc, 2021, 143, 14158

Primary authors: SANCHEZ-FERNANDEZ, Adrian (Universidadede Santiago de Compostela); JACKSON, Andrew (European Spallation Source)

Presenter: JACKSON, Andrew (European Spallation Source)

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