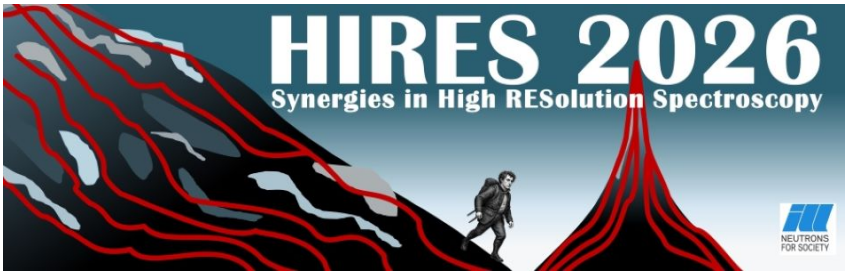

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Structural relaxation and nano-domain dynamics in highly concentrated electrolytes for zinc anode batteries

Due to their intrinsic non-flammable nature, aqueous batteries are regarded as desirable alternatives to lithium-ion batteries which use non-aqueous electrolytes. Metallic zinc has long been regarded as an ideal anode material for aqueous batteries systems. Highly Concentrated Zinc Electrolytes (HCZEs) are a new type of Water in BiSalt Electrolytes (WIBSE) which might enable practical zinc anode batteries, improving their cycle life and energy density.[1] HCZEs contain both a zinc salt and Li(TFSI) at very high concentrations, where TFSI is bis(trifluoromethanesulfonyl)imide. Ultimately, the effectiveness of HCZEs is believed to be due to i) the reduction of zinc hydroxide formation by depletion of water in the zinc ion solvation shell, through the segregation of water molecules in the solvation shell of the lithium ions, as well as ii) to the suppression of water activity.[2] Using neutron scattering methods, we investigated the molecular structure and relaxation dynamics in HCZEs. The relation between these results and the macroscopic transport properties, viscosity and conductivity, will be discussed.[3]

[1] F. Wang, *et al.*, Nature Materials, **17**, 543 (2018).
[2] F. Wang, *et al.*, Adv Energy Mater, **11**, 2102016 (2021).
[3] A. Faraone, *et al.*, J. Phys. Chem C, **128**, 12121 (2024).

Session

Liquids

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