

# NOVEL BATTERY CONCEPTS – SAME OLD ELECTROLYTES?

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Li-ion batteries have enjoyed decades of electrolyte development and the basic standard electrolyte recipes have more or less converged. On the other hand, the prerequisites on the electrolytes for the next generation batteries differ substantially and hence also the motivations for the choices needed to be made. But still the salts and solvents to be used are much the same – or not?

This presentation will detail out the main new relevant physico-chemical demands on the electrolytes from the perspective of the novel battery concepts of Li-metal, Li-S, Li-O<sub>2</sub>, and Na-ion [1-3]. This includes the different electrochemical stability windows (all), the stability vs. the superoxide radical anion (Li-O<sub>2</sub>), the various solubility issues (Li-S), the different cation-solvent interaction strengths (Na-ion), *etc.*

To be concrete a “smorgasbord” consisting of results from i) experiments using very specific model systems [4], ii) experiments using special *operando* set-ups [5], and iii) computations based foremost on quantum chemistry (DFT) but also combined with thermodynamics will be presented [6]. The information will be used to outline if, why, and how we can/should change the basic electrolyte chemistry for each of the novel battery concept – or not.

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[3] R. Younesi, G. M. Veith, P. Johansson, K. Edström, T. Vegge, *En. & Env. Sci.* 8 (2015) 1905-1922.

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