Ex situ, *in situ*, and *operando* Raman Spectroscopy of Battery Electrolytes

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Abstract:
A bit simplistic, there is at present two main lines of battery development: i) the optimal use of the commercial LIB technology and ii) the quest for the "best" post-Li/next generation battery. The former focuses on fast-charging and/or life-length, while the latter has many contenders: high-voltage LIBs, Na-ion, Li-S, M-air, Mg, Ca and Al battery technologies. By using Raman spectroscopy and focus on the electrolytes many properties and phenomena can be addressed – all aiming to increase our understanding and eventually serve for rational improvement – from fundamental materials development and screening[1] via method development[2] to degradation[3] and post-mortem analysis[4]. Here a "smörgåsbord" of examples from our lab[1-4] covering a wide range of materials, purposes, set-ups, and battery concepts and designs, will be provided to illustrate the versatility of Raman spectroscopy for battery electrolyte R&D.

References:
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Contribution: Invited