

Probing Electrode Materials Bulk and Interfacial Processes with NMR Spectroscopy

Michal Leskes¹

¹*Department Of Materials And Interfaces, Weizmann Institute Of Science, Rehovot, Israel*

E-mail: michal.leskes@weizmann.ac.il

The performance and lifetime of energy storage materials depend on electrochemical processes at the bulk of the electrode materials as well as degradation processes at their interface with the electrolyte. These can be challenging to characterize by conventional structural tools as they often involve structural disorder and phase heterogeneity. Solid state NMR (ssNMR) is well poised to probe such processes due to its high chemical specificity and the presence of a wide range of magnetic interactions which provide insight into local coordination environment, structural motifs and architecture as well as ion dynamics and transport.

In this talk I will describe how we utilize ssNMR to follow changes in local order and phase transformation at the bulk of electrode materials and degradation processes due to electrode-electrolyte interactions. Furthermore I will present how dynamic nuclear polarization (DNP), a technique which utilizes the electron spin polarization to boost the sensitivity of ssNMR, can be tailored to probe such processes with increased sensitivity and selectivity.

Keywords: [Energy storage](#), [SEI](#), [Solid state NMR](#)