

You are cordially invited to attend this seminar to be held on

Tuesday, December 12th, 15:00

Room 206, Wolfson Mechanical Engineering Building

Probing the electrode-electrolyte interface in rechargeable batteries by solid state NMR

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Reactions at the electrode-electrolyte interface in lithium ion and beyond Li batteries play a key role in the battery's performance and are one of the main causes for cell failure. These reactions, which lead to the formation of the solid electrolyte interphase (SEI), ultimately control the reversibility of the cell's Li chemistry and its kinetics. Thus an important part in the development of new high energy storage materials is control over their interfacial chemistry and reactivity with the electrolyte. Nuclear magnetic resonance (NMR) spectroscopy is an excellent approach for following the formation of interfacial layers as it can detect disordered and heterogeneous phases, providing information on their chemical composition, structure and dynamic properties. Its main disadvantage is its low sensitivity which is often a limiting factor when probing thin surface layers. In this talk I'll describe approaches to overcome this sensitivity limitation by isotope enrichment which enabled studies of the interfacial processes in silicon anodes and lithium- oxygen cells. I will also present first steps towards the implementation of a new hyperpolarization technique for signal enhancement, Dynamic Nuclear Polarization (DNP), which can potentially provide detailed molecular level insight into the surface chemistry of electrodes as well as other functional materials.



Dr. Michal Leskes completed a BSc in chemistry summa cum laude at Tel Aviv University in 2004. She earned her PhD in chemical physics, under the supervision of Prof. Shimon Vega, at the Weizmann Institute of Science in 2010, and conducted postdoctoral research in the lab of Prof. Clare Grey at the University of Cambridge, UK. She joined the Weizmann Institute's Department of Materials and Interfaces in July 2015 as a senior scientist.

She received Tel Aviv University's Dean and Rector as well as the Knesset Awards for outstanding students, the J.F. Kennedy Prize for achievements in her PhD studies, a Wolf Foundation fellowship, and the Award of Excellence by the National Postdoctoral Award Program for Advancing Women in Science. In 2012 she won a Marie Curie Postdoctoral Fellowship and in 2015 the Yigal Alon fellowship from the Israeli council of higher education. Dr. Leskes research interests include interfacial phenomena in energy storage materials and the development of novel magnetic resonance approaches for probing the bulk and interface of functional materials.