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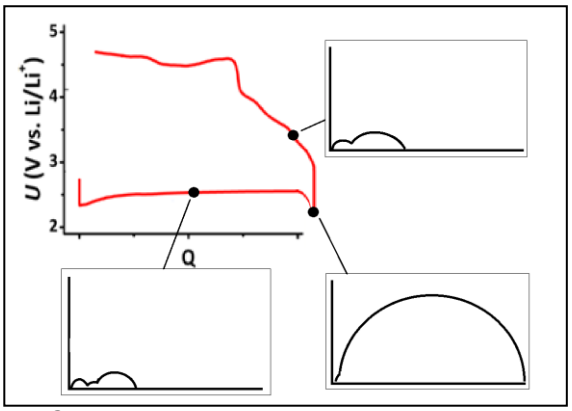
IMPEDANCE PERSPECTIVES ON LI-AIR BATTERY OVERPOTENTIALS

Jonathan Højberg[1,2], **Bryan D. McCloskey**[3], **Alan C. Luntz**[3,4], **Johan Hjelm**[1], **Keld Johansen**[2], **Poul Norby**[1], **Tejs Vegge**[1]

[1]*DTU Energy Conversion, Frederiksborgvej 399, DK-4000 Roskilde, Denmark, jonn@dtu.dk.* [2]*Haldor Topsøe A/S, Nymøllevej 55, DK-2800 Kgs. Lyngby, Denmark,* [3]*IBM Almaden Research Center, San Jose, California 95120, United States,* [4]*SUNCAT, SLAC National Accelerator Laboratory, Menlo Park, California 94025*



Lithium-air batteries have attracted much attention in recent years because of a potentially high specific energy density and experiments with flat electrodes show that the intrinsic electrochemistry of Lithium-air batteries has a very low overpotential[1]. In real batteries with a porous electrode, the observed overpotentials are, however, significantly larger[2]. The origin of the overpotentials at especially sudden death and during charge has been heavily debated in the literature. Among others, arguments proposed are based on modeling[1], DEMS measurements[2], in-situ TEM[3], and conductivity measurements using a redox-mediator combined with ex-situ characterization methods like FTIR and Raman[4].

In this presentation, a series of electrochemical impedance spectra measured at different states of charge and current densities will be used to analyze three states of the Lithium-air battery electrochemistry; The discharge plateau, sudden death and the initial stage of the charging process.

By combining the measurements with previous results presented by Bryan D. McCloskey and Alan C. Luntz et *al*. (ref. 1, 2 and 5 among others), the internal resistance in the battery is related to the measured overpotential. This relation is essential to understand the reactions inside the battery.

References:

[1] Viswanathan et *al*., *JPCL* **2013**, *4*, 556-560
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