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22. Juni 2016

Einladung zum Vortrag

von

Dr. Paul R. Shearing

University College London, UK

Tomographic Imaging of Electrochemical Devices in 3D and 4D

"Electrochemical device" is a term used to describe a group of technologies including fuel cells, batteries, electrolysers and super-capacitors. Whilst many of these technologies are already in common daily usage (for example Li-ion batteries that powered the consumer electronics revolution), in the future electrochemical devices will play an increasing role in our lives – from fuel cells that can power our homes to high performance batteries for our cars. These devices will play a key role in reducing our carbon footprint and improving security of energy supply. In spite of progress in recent years, improvements in durability and performance are required to accelerate the commercialization of these devices across a range of applications.

Electrochemical reactions in all of these devices are supported by porous materials which need to combine a range of functions including mass transport, catalysis and ionic and electronic conductivity: whilst the balance of these will vary between devices, there is a common link between the microstructure of the materials and its performance in the device. Our ability to engineer these microscopic features to maximize performance can be translated to substantial improvements in macroscopic device design and therefore an improved understanding the broad range of physical phenomena occurring in these porous materials is paramount to improving device performance and lifetime.

Over the past 10 years the increasingly widespread use of tomography has revolutionized our understanding of these materials; with increasing sophistication researchers have been able to characterize samples over multiple time and length scales from nm to mm and from ms to days. Here we consider examples of our work to explore these materials in three and "four" dimensions, presenting case studies fuel cells and batteries that utilize both laboratory and synchrotron X-ray sources. Furthermore, we explore how their application with complementary modelling and experimental tools can be used to inform a comprehensive understanding of these materials, from the atom to the device.

Termin: **Montag, 25.07.2016, 9:00 Uhr**

Ort: **Universität Ulm, Helmholtzstr. 18, Raum 2.20**

Der Vortrag findet im Rahmen des Forschungsseminars des Institutes für Stochastik statt.
Alle Interessenten sind herzlich eingeladen.

gez. V. Schmidt