



TECHNISCHE UNIVERSITÄT  
BERGAKADEMIE FREIBERG

Die Ressourcenuniversität. Seit 1765.

Montag, 3. Juni 2013 | Monday, 3rd June 2013  
12:00 – 12:45 Uhr

## Fundamental Principles of Battery Design

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**Abstract.** The presentation will first introduce the fundamental aspects of electrochemistry and material chemistry for energy storage in the light of battery engineering designs. For example, the ionic diffusion, the electrode-electrolyte interface, interfacial charge transfer and electrode catalytic processes will be discussed.

The discussion of such fundamental electrochemical aspects will be in conjunction with the design of batteries e.g. electrochemical assessable surface area for porous electrode, electrode catalytic reactions.

Two case studies will be discussed to demonstrate the application of electrochemical principals in battery design.

- Battery with air cathode – the high energy solution: In the light of previous session, the concept of air-diffusion - electrode will be introduced together with the selection of catalysts.
- Supercapacitor – the high power solution: The concepts of supercapacitor will be discussed with focus on the material science and cell engineering. Double-layer, metal oxide, H and Li asymmetric supercapacitors will be introduced.