



e-conversion



Seminarankündigung

**Dienstag, 13. April 2021
17:00 Uhr**

ONLINE via ZOOM

<https://tum-conf.zoom.us/j/66261345554>

Meeting-ID:66261345554

Kenncode: 585626

“Nanoscale probes of carrier-selective catalyst/semiconductor contacts in water-splitting photoelectrodes”

Heterogeneous electrochemical processes, including photoelectrochemical water splitting to evolve hydrogen using electrocatalyst-coated semiconductors, are driven by the accumulation of charge carriers and thus the interfacial electrochemical potential gradients that promote charge transfer. Conventional electrochemical techniques measure/control potentials at the conductive substrate or semiconductor ohmic contact, but are unable to isolate processes and electrochemical potentials at the surface during operation. I will present our recent work demonstrating that the nanoelectrode tip of an atomic-force-microscope cantilever can effectively sense the surface electrochemical potential of electrocatalysts coating semiconductor photoelectrodes during operation. This technique allowed us to unambiguously show that metal (oxy)hydroxide layers act as both hole collectors and oxygen-evolution catalysts on metal-oxide photoanodes such as Fe₂O₃ and BiVO₄. We also discovered the critical role that heterogeneous interfacial barrier heights, and a related nanoscale pinch-off effect, play in building carrier-selective interfaces in semiconductor photoelectrodes for generating fuel from sunlight.

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