DEPARTMENT OF CHEMISTRY AND PHYSICS OF MATERIALS

ANNOUNCEMENT

PARIS LODRON UNIVERSITÄT SALZBURG

Vortragsankündigung

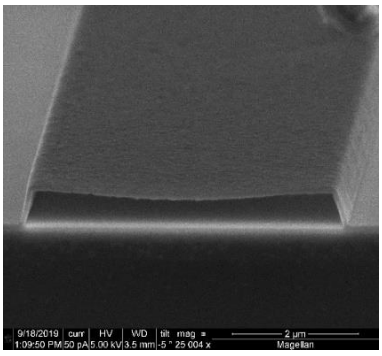
Mittwoch, 29. November 2023, 11.15 Uhr im SR I

Prof. Dr. Jan TORGERSEN

Lehrstuhl für Werkstoffwissenschaften, TU München

"Next generation Energy Conversion through the exact placement of matter in space"

Nowadays, we can process thin films down to the nm level. This capability is not only an enabler in semiconductor processing. This talk gives an overview into ultrathin oxide films that can help in the generation of novel M/NEMS devices [1], the tailoring of biological interfaces for enhancing osteogenesis of stem cells [2], the tuning of the degradation behavior of Mg alloys [3]. Particularly, we point out, how Pt based catalysts with mass activity up to 0.8 A mgPt−1 @0.9V iR-free towards the Oxygen Reduction Rection can be synthesized via a two-dimensional growth process and precise alloying with TiO2 [4,5]. Platinum Group Metal catalysts are usually deposited on a carbon support. The second part will introduce a novel way of patterning amorphous carbon according to a computer defined structure, a field termed architected carbon. With a patented process, our group can achieve architected carbon with dimensions in the cm scale having defined nanoscale features [6]. This could be achieved through novel photochemistry allowing a high char yield and limited shrinkage during the carbonization process. We present some initial results on mechanical and electrical properties of these substrates as well as the potential to tune kinetic performance of flow batteries, fuel cells and electrolyzers through this approach. A wide range of other applications are envisioned including novel electrode designs, carbon microelectromechanical systems, highly load bearing and lightweight structures, AFM tips and X-ray optical lenses.



Free standing shell structure consisting of a 50 nm thick Al_2O_3 membrane. Produced through Atomic Layer Deposition in combination with HF vapor etching.