



## IMN-KOLLOQUIUM

**15. Dezember 2021 um 13:00 Uhr via Webex**

**Assoc. Prof. Dr. Harald Plank**

Institute of Electron Microscopy and Nanoanalysis, Graz University of  
Technology, Graz Centre for Electron Microscopy, Austria

### 3D NANOPRINTING VIA FOCUSED ELECTRON BEAMS: PRINCIPLES AND APPLICATIONS

Additive, direct-write manufacturing has become an essential part in research and development during the last decade. Within the small pool of additive, direct-write technologies for nanoscale fabrication, focused electron beam induced deposition (FEBID), has done tremendous advances in recent years. That technology class relies on the highly localized nano-synthesis of surface adsorbed precursor molecules, which are introduced in the vacuum chamber by a gas injection system. Hence, there are only little demands on substrate materials (vacuum / beam compatibility) and surface morphologies (accessible by the beam), making them true direct-write methods. As a currently unique possibility, FEBID allows for the fabrication of even complex, freestanding 3D nano-objects. Together with constantly growing number of precursor materials and improving software packages for a reliable upfront design, 3D FEBID is ready to take on a cutting-edge role in the area of direct-write, additive manufacturing. In this presentation, we shed light on recent progress of FEBID with emphasis on current fabrication and tuning possibilities in 3D space and start with a basic introduction about the principle. We then turn briefly into materials, their structural and chemical composition and discuss post-processing approaches, which tune or even entirely change the material properties. Those aspects are complemented by several application examples, which strongly benefit from both, the 3D design and the partly unique material properties. The talk is closed with a view on remaining challenges to provide a comprehensive insight in 3D FEBIDs possibilities.

Vortragssprache: englisch