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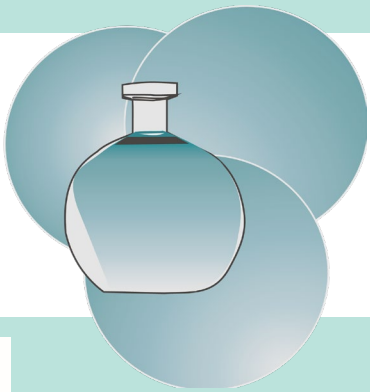

lädt ein

gemeinsam mit der Gesellschaft Deutscher Chemiker zum

Vortrag

von Herrn

Prof. Dr. Kornelius Nielsch

Technische Universität Dresden
Institut für Werkstoffwissenschaft
Professur für Metallische Werkstoffe und Metallphysik

“Non-epitaxial multilayers of 2D materials grown by Atomic Layer Deposition”

am: **Donnerstag, 20.11.2025**

um: 09:30 Uhr

wo: im Raum 1/232

Gäste sind herzlich willkommen!

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GDCh Gesellschaft Deutscher Chemiker

Non-epitaxial multilayers of 2D materials grown by Atomic Layer Deposition

Atomic layer deposition is a very versatile technology for the deposition of thin films with precise thickness control on large areas, non-planar surfaces and 3D objects. The chemical reaction is surface limited, well defined and works in most cases at low temperatures (RT to 250 °C). For a number of classical van der Waals 2D materials, there have been reports on ALD of transition metal dichalcogenide (TMDC) of MoS_2, SnS_2, WS_2 and WSe_2, which also included the electronic characterization as a field effect transistor (FET).

We have fabricated by atomic layer deposition (ALD) multilayers of layered materials based on topological insulators and van der Waals materials, called *ferecrystals.* These ferecrystals can be tailored to exhibit unusual properties such as high electrical conductivity or low thermal conductivity or magnetic properties. A detailed study was performed on multilayers of Sb_2Te_3 and SbO_x, which has been grown at the same temperature as single layers of Sb_2Te_3. The carrier mobility is very high >150 Vs^2/cm^2 and is even improved when the thickness of the Sb_2Te_3 layers is reduced and the number of SbO_x layers (typically 2 nm thickness) is increased. We have also grown ferecrystals based on Sb_2Te_3 and Sb_2Se_3 with tetrahedral and orthorhombic crystal structure, respectively. The p-type hole carrier concentration of Sb_2Te_3 films can be enhanced through the sublayer doping of Sb_2Se_3. As an outlook, we will also discuss other multilayered systems of layered materials and non-layered materials and show preliminary results on the ALD growth of oxychalcogenide layers.

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