

Extra session of [Focus Materialchemie](#) – Wed., **28.8.2024** 14:00 – @BC02A46 (Seminarraum Lehar 02; TU Wien, Getreidemarkt 9, BC) – [join us](#) on ZOOM (ID: 983 0066 2349) (on invitation of Bernhard Bayer-Skoff)

# From functional Polymers to functional devices based on nanofilms

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Stimuli-responsive materials are characterized by dynamic switching of their properties depending on external stimuli (e.g. light, pH, temperature, humidity). In particular, hydrogels change their size and shape when exposed to aqueous environments. Functional and responsive surfaces have been successfully deposited by initiated Chemical Vapor Deposition (iCVD) on a variety of substrates. iCVD allows to obtain stimuli-responsive thin films with high chemical specificity and this is important to obtain a large responsiveness amplitude. In addition, the thin film form allows obtaining fast response.

This presentation will focus on the applications of stimuli-responsive nanofilms for drug delivery devices, sensors and actuators. Their combination with piezoelectric ZnO will also be discussed for innovative device geometries. ZnO is characterized by versatile and unique material properties that are an asset for applications ranging from cosmetics to optoelectronics. Emerging applications employ ZnO in transparent conductive oxides or piezoelectric nanogenerators. In particular, atomic layer deposition allows to deposit ZnO with a preferential orientation, which depends on the growth temperature and is directly linked to its piezoelectricity. In this talk, an example of application of piezoelectric ZnO deposited from ALD will be shown for sensing. A force, humidity and temperature responsive electronic skin will be presented, obtained by combining piezoelectric ZnO and a thermoresponsive hydrogel into core-shell nanostructures using ALD and initiated chemical vapor deposition.