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NANO-STRUCTURED POLYMERIC/HYBRID MATERIALS

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In the first part, a summary of the design, the assembly, and the structural and functional characterization of nanostructured materials using anodized aluminum oxide (AAO) as a template is described. A particularly powerful analytical tool is optical waveguide spectroscopy using the nanoporous template as the guiding structure. It is demonstrated that this format allows for a very sensitive label-free detection of analytes of low molecular mass. Other strategies for using the AAO layers as templates include the growth of polymeric nano-rod arrays from different functional monomers which after the dissolution of the template are still able to guide light. This opens up novel concepts for integrated optics platforms with nanostructured materials. In the second part, we introduce an electronic transducer principle based on graphene field effect transistors that allow us to monitor enzymatic activities of multilayer assemblies by this novel analytical approach.

Recent Publications

1. O J Lee, et al., (2017) Layer-by-layer self-assembly of bisdendrons: An unprecedented route to multilayer thin films. *Macromol. Res.* 24:851.
2. E Piccinini, et al., (2016) Enzyme-polyelectrolyte multilayer assemblies on reduced graphene oxide field-effect transistors for biosensing applications. *Biosens. Bioelectron.* 92:661.
3. W Knoll, et al., (2011) Nanostructuring polymeric materials by templating strategies. *Small* 7:1384.



Biography

Wolfgang Knoll earned a PhD Degree in Biophysics from the University of Konstanz in 1976. From 1991–1999 he was the Laboratory Director for Exotic Nanomaterials in Wako, Japan, at the Institute of Physical and Chemical Research (RIKEN). From 1993–2008, he was a Director at the Max Planck Institute for Polymer Research in Mainz, Germany. Since April, 2008, he is the Scientific Managing Director of the AIT Austrian Institute of Technology. Since 2010, he is a Regular Member of the Austrian Academy of Sciences. In 2012 he received an Honorary Doctorate from the University of Twente, the Netherlands, and in 2017 he became a Member of the Academia Europaea. His research interests include soft materials science, biophysics, surface plasmon optics, biosensing and smell sensing.

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