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FAKULTÄT FÜR CHEMIE

Einladung zum Vortrag von

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Sol-gel-based nanostructured coatings, processing by dip-coating and characterization by ellipsometry

Complex hierarchical nano structured (hybrid) coatings can be achieved when combining chemical advanced bottom-up strategies, such as self-assembly and sol-gel chemistry, together with liquid solution processing. Amongst them, dip-coating is an extremely versatile tool to prepare coatings of various chemical compositions and structures from liquid solutions and has been used for many decades without taking advantage of its whole potentiality. This communication reports first on the recent implementations of the dip-coating process, including controlled atmosphere, capillary deposition, thickness gradient, deposition from supernatant, angle dependence deposition, and single side deposition. Besides, in most applications, sol-gel coatings interact with the ambient atmosphere and physical-chemical properties may be altered through temperature and humidity variation or adsorption of volatiles species present in the surrounding medium. Such phenomena are difficult to assess and it will be demonstrated that ellipsometry is not only a technique adapted to deduce optical constant and physical thickness of optical layers, but is also highly appropriated to the determination of adsorption/desorption mechanisms. Finally, many microfabrication tools can be used to further process the coating and obtained controlled patterns, amongst which soft-nano imprint lithography (Soft-NIL) has proven to be simple to apply to the as-prepared xerogel. This approach will be discussed in terms of adjustment of critical processing parameters and applications in controlled wetting, photonics and gas detection will be presented.

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