

Seminar Odjela za fiziku

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Application of atomic layer deposition (ALD) in the preparation of functional hybrid nano-materials

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Abstract

Atomic layer deposition (ALD) utilizes gas phase precursors in repeating cycles to grow usually inorganic thin films. As substrates can be used various inorganic, organic or even biological materials containing active surface groups. The key advantage of ALD is an excellent control at the nanoscale over film thickness, which is particularly desired in the preparation of advanced materials, such as organic-inorganic hybrids, employed in modern technological applications.

We study the surface modification of ALD grown metal oxide semiconductors by different strategies in order to build the organic constituents: organosilane self-condensation or “click” reactions (thiol-ene or azide-alkyne cycloaddition). The resulting hybrids contain terminal functional groups for additional deposition of metal oxides by ALD, thus leading to modular layered structures. We also investigate their altered properties relative to the initial materials, with a focus on wettability and photocatalytic performances.