

## Atomic Layer Deposition: Principle and Applications

The presentation will introduce a very modern deposition technique - Atomic Layer Deposition (ALD). It is very attractive and universal technique that allows to deposit on virtually any surface (flat, structured, curved) thin mono-, bi- and multilayers of a range of materials (oxides, sulfides, selenides, carbides, nitrides, metals incl. noble metals). Due to its unique abilities, ALD and as-produced thin layers can be used for manifold purposes in different fields, such as photovoltaics, batteries, catalysis, etc. The presentation will discuss various possibilities of this technique. Selected examples will also show the ability of ALD to functionalize various materials.

## Depozice atomárních vrstev: princip a aplikace

Prezentace představí velmi moderní depoziční techniku založenou na depozici atomárních vrstev (Atomic Layer Deposition, ALD). Jedná se o velmi atraktivní a univerzální techniku, která umožňuje na povrchu jakéhokoliv materiálu (s rovným, strukturovaným i nerovným povrchem) deponovat mono-, bi- a vícevrstvy různých jiných materiálů (např. oxidů, sulfidů, selenidů, karbidů, nitridů, kovů, včetně vzácných kovů). Díky svým unikátním možnostem je technika ALD a jí připravené vrstvy využívána v celé řadě odvětví, jako např. fotovoltaice, bateriích, v katalýze, apod. Diskutovány budou různé možnosti využití této techniky, na konkrétních příkladech budou také demonstrovány výhody této techniky pro modifikace nanomateriálů.



Jan Macak is senior researcher, group leader and vice-head of Center of Materials and Nanotechnologies of Faculty of Chemical Technology of University of Pardubice. He belongs among most cited living Czech chemists (H index = 55, citations > 11000). He is author or coauthor of more than 100 papers, which are mainly focused on the self-organized nanotubes of valve metals, e.g. TiO<sub>2</sub>.

In 2003, he finished his master studies in power engineering at the University of Chemistry in Prague. He defended Ph.D. in materials sciences in 2008 at FAU Erlangen in Bavaria, Germany. Afterwards he worked for several years in nanotech industry.

In 2014, he received as the only Czech scientist that year a prestigious Starting Grant from European Research Council within HORIZON 2020 program, within physical and materials sciences. His project CHROMTISOL combines nanotube layers of TiO<sub>2</sub> with suitable inorganic and organic chromophores, declared that this connection should lead to an efficient conversion of solar to electrical energy.

For his great contribution to the field and research outputs, he received in 2015 prestigious Neuron Award 2015 for outstanding achievements of young scientist in the field of chemistry.