

VIRTUAL SEMINAR

Thursday, 16.9.2021 at 11:15

MPŠ Seminar 3

ANODIZED TITANIUM FOILS FOR A FLEXIBLE TiO₂ PHOTOCATALYST

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TiO₂ nanotubes possess many unique physicals, optical, and electrical characteristics. Moreover, they exhibit many other properties like non-toxicity, high resistance to corrosion, biological and chemical inertness. That potential made them widely researched material that can be used for various applications. Electrochemical anodisation is a highly controlled process that results in self-organised TiO₂ nanotube layers which provide a highly defined and ordered geometry with high mechanical strength. The growth occurs by simple oxidation of titanium substrate under a specific set of experimental conditions inside the electrochemical cell.

In our work we studied the anodisation of titanium foils of different thicknesses and distinct surface treatment and the photocatalytic activity of the resulting TiO₂ nanotubular layers. All the titanium foils were anodised simultaneously under identical experimental conditions to avoid the influence of ageing of the anodising electrolyte and other anodisation parameters, such as voltage, time and temperature. Microstructures on the titanium foils were characterised by EBSD, SEM, optical microscope, and stylus profilometer analyses. The morphology of the grown TiO₂ nanotubes was studied in detail using the SEM technique, while the nanotubular surface areas were determined with a 3D optical interference profilometer. Their chemical composition was established with the means of XPS. The degradation of caffeine under UV irradiation was measured periodically over several hours with a high-precision UV-Vis-IR spectrophotometer. Photoluminescence and EPR methods were used to confirm the photocatalytic behaviour of the TiO₂ nanotubular layers.

Kindly invited.