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Ultrathin multifunctional composite coatings**Vaino Sammelseg**

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In this presentation, two novel types of composite ultrathin coatings engineered for corrosion protection will be introduced: the first, for anodizable metals and the second for widely used stainless steels, both biocompatible. The first type coating, its technology and performance will be introduced on an example of easily corroding Al2024 alloy, the coating is patented (GB2509335-Corrosion resistant coatings and a method of preparing such coatings) and its study results are sent for publication. The technology consists of special anodizing of the substrate surface and top coating of nanometric metal oxide layers using Atomic Layer Deposition (ALD) method. In result, a corrosion protection composite $\geq 1 \mu\text{m}$ thick coating is formed. The coating worked well in salt solution immersion (7000 h) and salt spray (1000 h) standard tests. The second type of sub-micron thick coating consists of nano-metric graphene oxide interface layer and added ALD laminated top layer. Its performance was demonstrated on AISI 304, the coating withstood well in 30 days immersion test in salt solution. The role of the graphene interlayer and the development of ALD technology for the corrosion protection will be discussed in the presentation.

Biography

Vaino Sammelseg has completed his PhD from Institute of Physics of the Estonian Academy of Sciences. He is currently the Professor of Inorganic Chemistry and Head of Materials Science Department of the University of Tartu, Estonia. His research areas are materials chemistry, thin film and surface technologies, including ultra-thin protective and functional coatings, nanomaterials characterization and testing. He has published more than 150 papers in reputed journals and is co-author of several patents. He is a Member of ECS and MRS.

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