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Revolutionary thin protective and functional Nanostructured coatings

In the presentation the results of studies of novel technology, including. low-temperature atomic layer deposition (ALD), nano-characterization, include. high-resolution microscopy and surface spectroscopy, and complex testing, include electrochemical and mechanical methods, for different thin, submicron thick coatings on aluminum and titanium alloys, and stainless steels will be introduced. The component list counts of the hybrid and composite nanostructured coatings, electrodeposited polypyrrole, CVD grown large area graphene or mechanically/ mechanochemically prepared graphene nanoplatelets, anodic oxide layers, ALD prepared inorganic films and their laminates, the latter sealing also deep pores of the anodic layers. Pre-treated surfaces and thin coatings were thoroughly characterized (HR-SEM, -(S)TEM, SPM, XPS, XRF, XRD, XRR, μ-Raman, FTIR) and tested (by chemical-, quick and prolonged electrochemical tests, incl. immersion and salt spray, adhesion-, peeling-, and hardness tests). Biocompatibility of different surface finishing was checked by *in-vitro* cell growth and studies, and the best treatments determined. Also excellent corrosion protection coatings were demonstrated and an industrial introduction is in progress. For energy applications functionalization of surfaces with nanoparticles, incl. non-precious metals prepared by different methods was studied, which results will be introduced in the presentation, also the electrode corrosion protection will be discussed.

Speaker Biography

Sammelselg V has completed his PhD in 1989 at Institute of Physics of Estonian Academy of Sciences. He is head of department of Materials Science and professor of Inorganic Chemistry of the University of Tartu, Estonia. His scientific interests relate to technology and characterization of nanostructured materials, nanofilms and -particles/-platelets. He has over 150 publications and several patents that have been cited over 3000 times, his publication H-index is 31 and he has been serving as a reviewer of many reputed Journals.

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