

26th International Conference on **Advanced Nanotechnology**
&
2nd Edition of International Conference on
Materials Technology and Manufacturing Innovations

October 04-05, 2018 Moscow, Russia



Väino Sammelselg

University of Tartu, Estonia

Thin and ultrathin protective coatings - unapparent but already in industry

Corrosion costs are still huge, reaching up to 1% from gross national product of many industrial countries. From other side society cannot develop further without considerable saving in energy and materials, and better protecting our environment. Transferring these demands into the coatings world mean that the coatings must be as thin as possible and produced by energy and environment saving technologies. Thin and ultrathin coatings have several naturally positive properties as compared with the traditional, thick protective coatings: better elasticity and optical transparency, smaller residual stresses, etc. But thin coatings must be still well protective, wear resistive, and if needed, paintable and/or biocompatible. For development of thin protective coatings several techniques were used, e.g. atomic layer deposition, ALD, for preparing nanolaminates of metal oxides and electrophoresis for nanographene ultrathin films [1]; also anodizing plus ALD for new thin protective coating applicable for anodizable alloys [2]. In the presentation will be given results of laboratory studies and tests and reviewed first introductions of the methods into industry, and discussed perspectives of further developments.

1. J. Mondal, A. Marques, L. Aarik, J. Kozlova, A. Simões, V. Sammelselg. *Corr. Sci.* 105 (2016) 161.
2. V. Sammelselg, L. Aarik, M. Merisalu, Method of preparing corrosion resistant coatings, WO 2014102758 A1 20140703. , Publication date: July 3rd 2014; Priority date: Dec. 31st 2012.

Biography

Väino Sammelselg has completed his PhD in 1989 from Institute of Physics of Estonian Academy of Sciences and following years was visiting researcher in several universities of Finland and Sweden. In 2003 was elected inorganic chemistry professor in the Institute of Chemistry of University of Tartu, is serving today also as head of materials science department in the Institute of Physics. His main scientific interests are thin film and coating technology and characterization, corrosion protection and nanotechnology applications. He has published more than 140 papers referred in WOS database, and has h-index 32.

vaino.sammelselg@ut.ee

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