

Wednesday Afternoon, May 25, 2022

Awards Convocation and Honorary Lecture

Room Town & Country A - Session HL-WeHL

Bunshah Award Honorary Lecture

Moderator: Ivan G. Petrov, University of Illinois at Urbana-Champaign, USA

5:45pm HL-WeHL-1 R.F. Bunshah Award and ICMCTF Lecture Invited Talk: **Functional Coating and Surface Engineering for Real Life, Jolanta-Ewa Klemberg-Sapieha (jsapieha@polymtl.ca)¹**, Polytechnique Montréal, Canada

INVITED

Over the past several decades, we have witnessed significant advances in numerous scientific and technological sectors thanks to the development of new thin-film and coating systems and surface engineering approaches, frequently based on the use of plasma processes. In many cases, the ever-increasing requirements involve an “ideal” combination of the mechanical, tribological, corrosion, thermal, and other characteristics, as well as high durability that can only be satisfied by using specifically tailored film architectures including nanocomposite, nanolaminate, multilayer, and graded layer systems. Such progress has been possible based on an in-depth understanding of the evolution of the microstructure during the film growth, of the intimate relationship between the microstructure on the atomistic and nanometer scales and the macroscopic properties, and the physical and chemical effects involved in plasma-surface interactions.

This presentation will highlight a journey of the development of plasma processes and functional and multifunctional coatings in our laboratory, involving numerous students and collaborators, that has been motivated by curiosity, by real-life/practical applications, coating systems performance and durability, and the prospects for sustainable future. In particular, I will illustrate my contributions to the field of surface engineering by taking examples from four main periods of activity, namely (i) high-frequency plasma for surface activation and plasma polymerization, (ii) functional coatings on plastics with a tailored optical, barrier, and anti-scratch characteristics and resistance to the outer space environment, (iii) hard and elastic, wear-resistant nanocomposite protective coatings for manufacturing applications, and (iv) protective coatings for harsh environments providing high resistance to solid particle erosion, ice accumulation and high-temperature oxidation suitable for aerospace applications.

¹ R.F. Bunshah Awardee

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