Fundamental Aspects of Coatings (joint session with ICMCTF)

Wednesday, May 3, 2017: 1:00 PM-3:40 PM

1:00 PM	INVITED TALK: Surface Functionalization of Biomaterials by Plasma and Ion Beam ***Paul K. Chu**, City University of Hong Kong*
1:40 PM	Linking Target Microstructure with its Sputter Performance ***Christian Linke**, Plansee SE; Jörg Winkler, Plansee SE; Harald Köstenbauer, Plansee SE; Dominik Lorenz, Plansee SE; Michael Eidenberger-Schober, Plansee SE*
2:00 PM	Residual stress in thin films: effect of processing conditions and microstructure ***Eric Chason**, Brown University; Alison M Engwall, Brown University; Zhaoxia Rao, Brown University*
2:20 PM	INVITED TALK: Thin Film Strain Gages for High Performance Applications ***Otto Gregory**, University of Rhode Island*
3:00 PM	Building a sputtering tool with off the shelf components ***James W Moore, VP Engineering**, MDC Vacuum LLC*
3:20 PM	Quantum Contact Mechanics for Holistic Surface Optimization ***Norbert Schwarzer**, SIO*

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INVITED TALK: Surface Functionalization of Biomaterials by Plasma and Ion Beam

Wednesday, May 3, 2017: 1:00 PM

Paul K. Chu *, City University of Hong Kong, Hong Kong, China*

The relationship between biomaterials and biological matters and tissues depends on the surface properties of the biomaterials and biological responses. Since most biomaterials having favorable bulk properties such as inertness, strength, and durability may not perform the pre-designed and desirable biological functions, surface modification is frequently performed. In this respect, plasma-based and ion-beam-based technologies offer the unique capability that some surface properties of the materials can be modified selectively to cater to the biological requirements and the aforementioned desirable bulk materials attributes can be retained. In particular, plasma immersion ion implantation and deposition (PIII&D), which combines the advantages of plasma and ion beam treatment, is widely applied to the surface treatment of biomaterials and medical implants. It is a non-line-of-sight technique and suitable for biomedical devices with a complex shape such as orthopedic implants, scoliosis correction rods, cardiovascular stents, and artificial heart valves. In this invited talk, recent research performed in the Plasma Laboratory of City University of Hong Kong pertaining to plasma treatment of biomaterials and biomedical devices will be described. Examples include nanostructured coatings/surfaces, biodegradable metals and polymers, bacterial resistance, and biocompatibility.

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