Biomaterial Interfaces
Room 311 - Session BI1-WeA

Protein-Surface Interactions
Moderator: J.Y. Wong, Boston University

2:00pm **BI1-WeA1 Time of Flight Secondary Ion Mass Spectrometry (ToF-SIMS) of Short Peptides-Noble Metal Surface Interactions Analyzed by Principal Component Analysis (PCA)**, ***N. Suzuki***, *L.J. Gamble, D.G. Castner, M. Sarikaya, F.S. Ohuchi,* University of Washington

Recent progress in the adaptation of combinatorial biology selection protocols to materials science has created a new class of polypeptides with specific affinity to inorganics. Here, we have used short peptide chains whose sequence consists of MHGKTQATSGTIQS in single- and triple-repeat forms, and have assessed quantitatively their binding specificity to Au, Ag and Pd surfaces by Time of Flight Secondary Ion Mass Spectroscopy (ToF-SIMS). Due to high mass resolutions, ToF-SIMS is capable of providing information about specific amino acidsâ?"surface interactions as well as their mutual interactions at the surface, but numerous mass fragments from the amino acids complete the analysis. We have therefore adopted Principal Component Analysis (PCA) to the static ToF-SIMS spectra, from which characteristic information related to binding specificity was obtained by reducing the dimension of data sets. The score plot in the PCA analysis has revealed that the effect of alkali ions from buffer solution significantly alters the fragmentation patters. Once, the grouping based on alkali ions content is carried out, the loading plot within the same group suggests that the strength of a localized amino acid sequence, MHGK, observed from the triple repeated chain differentiates the binding characteristics specific to a certain type of inorganics. In addition, the inherent binding site of this peptide toward inorganics is determined from loading plots. This technique is capable of analyzing the complex, multivariate ToF-SIMS spectra from the adsorbed polypeptide films and compared to univariate methods providing unique insight about the sample.

2:20pm **BI1-WeA2 The Application of Magnetic Tweezers to High Throughput Screening of Peptide Libraries**, ***H. Shang***, *G.U. Lee,* Purdue University

Single molecule force measurement techniques, such as, the atomic force microscope (AFM), have provided us with the ability to directly measuring the force and displacement involved in the rupture single ligand-receptor interactions. These techniques are providing us with fundamentally new information about molecular recognition interactions, which potentially is extremely useful for designing ligands for specific receptors. Magnetic tweezers is a technique in which micron size paramagnetic particles are used to transduce pico-newton scale force to single ligand-receptor pairs. This technique has the force resolution of a single hydrogen bond and allows millions of ligand-receptor pairs to be simultaneously screened. A kinetic model is used to analyze the data and the binding affinities of different ligand-receptor pairs are revealed by statistical analysis. The advantage of using this technique over conventional assays is that force can be used to define the affinity of the bond. In this presentation, we review recent single molecule force measurements with AFM and advances that have been made in screen phage libraries using magnetic tweezers.

2:40pm **BI1-WeA3 Invited Paper**, ***M. Grinstaff***, Boston University **INVITED**

NO ABSTRACT SUBMITTED.

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