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Meital Reches, PhD

The Institute of Chemistry and the Center for Nanoscience and Nanotechnology, Faculty of Science
The Hebrew University of Jerusalem

http://chem.ch.huji.ac.il/~mreches/

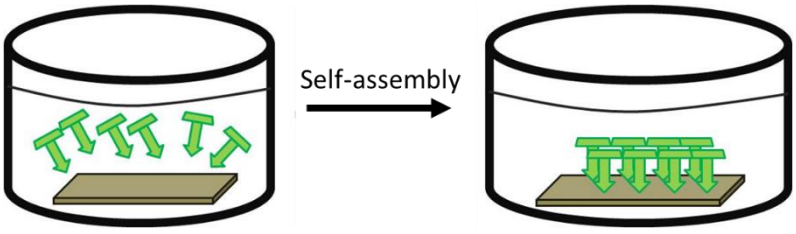
Title:

Functional Peptide Assemblies on Surfaces: Toward Green Antifouling Materials

המפגש יתקיים
ביום א', 8 מרץ 2015, בשעה 9:00
מועדון סגל
(3/8/2015, 9:00, Faculty Club)

Abstract:

Several natural processes are mediated by the interactions between organic and inorganic materials. The immune response towards an implant inserted into the body is mediated by proteins. Composite materials are formed by the interactions of organic materials (usually proteins) and minerals. Biofouling, the process in which organisms attached to surfaces, is also mediated by organic molecules. Understanding the nature of interactions between organic and inorganic materials will bring to the development of improved implants, new composites and antifouling materials. This lecture will present single-molecule force spectroscopy measurements of the interactions between individual biomolecules (either amino acid residues or short peptides) and inorganic surfaces in aqueous solution. In the case of amino acids, we functionalized AFM tips with individual residues that represent different classes of amino acids. Force–distance curves measured the interactions of the individual amino acid bound to the AFM tip with a silicon substrate or mica. Using this method, we were able to measure low adhesion forces and could clearly determine the strength of interactions between the individual amino acid residues and the inorganic substrate. In addition, we observed how changes in the pH and ionic strength of the solution affected the adsorption of the residues to the substrates. Our results with peptides also shade light on the factors that control these interactions. Overall, our findings contribute to the understanding of the interactions at the organic–inorganic interface. These results may have implications for our perception of the specificity of peptide binding to inorganic surfaces. Moreover, based on our knowledge, we designed a short peptide that can form an antifouling coating and therefore can prevent hospital-acquired infections.



סגל וסטודנטים מוזמנים להשתתף
לתיאום פגישה: yaelf@savion.huji.ac.il