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Attachment dynamics of Photosystem I on nano-tailored surfaces for photovoltaic applications[1] DIBYENDU MUKHERJEE, Department of Chemical and Biomolecular Engineering, University of Tennessee, BARRY D. BRUCE, Department of Biochemistry and Cellular Microbiology, University of Tennessee, BAMIN KHOMAMI, Department of Chemical and Biomolecular Engineering, University of Tennessee — Photosystem I (PSI), a biological photodiode, is a supra-molecular protein complex that charge separates upon exposure to light. Effective use of photo-electrochemical activities of PSI for hybrid photovoltaic (PV) device fabrications requires optimal encapsulation of these proteins onto organic/ inorganic substrates. Our results indicate that various experimental parameters alter the surface attachment dynamics of PSI deposited from colloidal aqueous buffer suspensions onto OH-terminated alkanethiolate/Au SAM substrates, thereby resulting in complex structural arrangements which affect the electron transfer and capture pathway of PSI. We present surface topographical, specific adsorption and polarization fluorescence characterizations of PSI/Au SAM substrates to elucidate the protein-surface interaction kinetics as well as the directional attachment dynamics of PSI. Our final goal is to enable site-specific homogeneous attachment of directionally aligned PSI onto chemically tailored nano-patterned substrates.

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