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Adsorption of Proteins to Cu(II)-IDA and Ni(II)-IDA Functionalized Langmuir Monolayers and Insertion Processes by Grazing Incidence Neutron and X-ray Techniques MICHAEL KENT, HYUN YIM, DARRYL SASAKI, Sandia National Laboratories, SUSHIL SATIJA, YOUNG-SOO SEO, National Institutes of Standards and Technology, IVAN KUZMENKO, THOMAS GOG, Argonne National Laboratories, JAROSLAW MAJEWSKI, Los Alamos National Laboratories — The adsorption of myoglobin, lysozyme, and several synthetic helical peptides to Langmuir monolayers of a metal-chelating lipid in crystalline phase was studied using neutron and X-ray reflectivity and grazing incidence X-ray diffraction. In this system adsorption is due to the interaction between chelated divalent copper or nickel ions and the histidine moieties at the outer surfaces of the proteins. Adsorption was examined under conditions of constant surface pressure ranging from 30 to 40 mN/m, and at constant area at an initial pressure of 40 mN/m. Layer characteristics were obtained as a function of time during the adsorption process by neutron and X-ray reflectivity. Insertion of segments into the lipid membrane was detected by a strong increase in surface pressure for constant area experiments, and by disruption of lipid crystalline packing for constant pressure conditions. The conditions affecting both processes will be discussed.

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