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Abstracts of Papers Presented at

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Abstracts of the contributions in the various topics may be found grouped according to the indicated pages:

LOW-FIELD DESORPTION IMAGING OF PROTEINS*

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A novel low-field (< 1 V/Å) desorption technique is described for imaging the contour of protein molecules placed on the apex of field-emitter tips. Image contrast relies on a distinct and measurable difference in the desorption field of a species of low ionization potential physisorbed on the molecule, and on the adjacent tip surface below 80 K. Preliminary results are described, using benzene to image Bovine Serum Albumin (BSA) and Immuno-Gamma-Globulin (IgG). Although the imaging procedure appears to be feasible, extreme difficulty in reproduceably placing the proteins on the tip apex, in the desired concentration, has been encountered. These difficulties together with future implications of the technique will also be discussed.

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SURFACE ADSORPTION

SINGLE ATOM SELF DIFFUSION ON NICKEL*

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Past FIM studies of surface diffusion have been limited to 5d and 4d transition metal substrates. The importance of extending this powerful technique for the study of the atomic mechanisms of surface interactions to the 3d transition series metals is clearly evident. In this paper we present the results from self diffusion studies on several of the low index planes of nickel. We also include some discussion of the specimen preparation techniques which are required to produce nickel surfaces of sufficient perfection for surface diffusion studies.

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BINDING SITES AND BINDING STATES OF Sn ON W

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The binding sites of tin atoms on a tungsten surface are studied by superposing the image of a pseudomorphic tin layer upon the image of a substrate tungsten surface. Superposed micrographs indicate that the lateral locations of the tin atoms correspond to the locations of unoccupied tungsten lattice sites above the surface.

Variations in field emission current with increasing evaporation field are also studied for the (011), (111), (112) and (114) planes. Evaporation of adatoms can be noticed by a sharp increase or decrease in the emission current at the field strength corresponding to the binding state of the adatoms. The binding states of the tin atoms on these planes are discussed.

FIELD ION MICROSCOPY OF GALLIUM ON TUNGSTEN*

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The field evaporation of Ga from a W emitter was investigated using a magnetic sector atom probe field ion microscope. A continuous supply of Ga was provided by adjusting both tip temperature and electric field. The Ga coating of a W tip was achieved by dipping the tip in liquid Ga at 325 K in air. A clean W and cap was obtained by field-evaporating the tip at 78 K. By raising the temperature to 300 K Ga atoms diffused from the shank of the tip and field-evaporated from the tip apex at fields (2V/Å) well below the evaporation field of W (5.7 V/Å). The rate of Ga evaporation could be controlled over a wide range by varying either the