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INITIAL STAGE OF OXIDATION ON Si(113) $3 \times 2$  SURFACE H. S. KIM, C. C. HWANG, Y. K. KIM, J. S. KIM, C. Y. PARK (Dept. of Physics, SKKU, Suwon, 440-746, Korea)

The initial oxidation of clean Si(113) $3 \times 2$  surface was studied by LEED (Low Energy Electron Diffraction) and SRPES (Synchrotron Radiation Photoemission Spectroscopy). The valence band and core level spectra were measured with increasing oxygen dose simultaneously. Two shoulders (S1, S2) which are located at higher and lower binding energy side with respect to bulk peak in surface sensitive Si 2p spectrum and the surface state (SS) originated from dangling bonds in valence band spectrum were observed. Up to 21 L where the structural change to a  $3 \times 1$  phase occurs, S1, S2 and SS diminished concurrently and disappeared completely at 221 L. In this paper, we will suggest the possible origins to cause the transition between  $3 \times 2$  and  $3 \times 1$  phases at the initial stage of oxidation.

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GROWTH OF Pt THIN FILMS ON Cu(111) AND FORMATION OF Pt/Cu SURFACE ALLOYS : GROWTH MECHANISM AND DIFFUSION BARRIER, JIN-HYO BOO, SOON-BO LEE (Dept. of Chemistry, Sung Kyun Kwan University, Suwon 440-746, Korea), UWE SCHRÖDER, RALF LINKE, and KLAUS WANDEL (Institute of Physical and Theoretical Chemistry, University of Bonn, Wegelerstr. 12, D-53115 Bonn, Germany)

Ultra thin platinum films evaporated on Cu(111) at 100K and room temperature have been investigated by *in situ* AES and LEED. A growth mechanism of layer-by-layer type was evidenced up to at least 5 ML Pt. Over the first Pt monolayer, the Pt-Pt bond distances are strained about 7 % beyond the equilibrium bond distances found for bulk platinum. Surface alloys were formed by diffusing the Pt adatoms into the Cu(111) substrate at temperature above 500K with a diffusion barrier of 0.85 eV. For the higher annealing temperature the Pt concentration gets smaller. From an Auger depth profile, a diffusion barrier of surface alloy formation is estimated by using the Ficks law.

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BIOMIMETIC CRYSTALLIZATION CONTROLLED BY MIXED SUPRAMOLECULAR SURFACES, D.J. AHN, D.Y. GOH, and G. S. LEE (Dept. of Chem. Eng., Korea Univ., Seoul 136-701, Korea)

Goal of this study is to control the morphology of the crystals by varying the composition of the supramolecular template films, hence changing the interfacial chemistry and interaction with the solution. Polymerized pentacosadiynoic acid (PDA) and stearyl alcohol (StOH) template films were fabricated using Langmuir-Schaefer deposition. For the pure PDA films, calcite (012) face was nucleated at the film surface. The crystallographic a-axis of (012) face is aligned along with the direction of linearly polymerized PDA backbone. Macroscopically, the (012) crystals were aligned along with each other. For the 8:1 (molar ratio) PDA:StOH mixture films, calcite (012) crystals were found but, no such crystal alignment was observed. Since the domain size of the polymer is significantly reduced as observed by AFM, their long-range alignment is now forbidden. For the 4:1 films in which PDA is still major, the aragonite is unexpectedly the major crystal structure. Therefore, it can be concluded that, in addition to ionic interaction and stereochemistry, the template domain size is an important factor to determine the morphology of growing calcite crystals.

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SURFACE AND INTERFACIAL BEHAVIOR DURING THE CRYSTALLIZATION OF a-Si:H FILMS DEPOSITED BY DC-SADDLE FIELD CVD; AN IN-SITU SYNCHROTRON X-RAY SCATTERING STUDY, H. J. KIM, S. H. JEON, AND D. Y. NOH (Department of Materials Science and Engineering, and Center for Electronic Materials Research, Kwangju Institute of Science and Technology, Kwangju 506-712, Korea)

The crystallization in a-Si:H/Si(001) films of various thicknesses was studied using in-situ synchrotron x-ray scattering during annealing in vacuum and in air. The surface morphology was investigated by x-ray reflectivity and the theta rocking curves at low angle, and the growth of crystalline phase was studied by conventional wide angle x-ray diffraction. The crystal truncation rod was measured to investigate interfacial variations. The surface of a  $2 \mu\text{m}$  thick film became rough at  $300^\circ\text{C}$  while the amorphous Si was transformed to polycrystalline solid at as high as  $650^\circ\text{C}$ . A 1100 Å thick film showed quite different crystallization process. The surface stayed smooth during the whole crystallization process. The amorphous Si became epitaxial Si(001) in vacuum annealing to  $650^\circ\text{C}$ . We suggest a mode for crystallization of thin a-Si:H/Si(001) films.