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One dimensionally modulated Ag films grown on Si(111) decorated by atomic chains AARON GRAY, TAI CHIANG, U. of Illinois Urbana Champaign, HAWOONG HONG, Argonne National Lab, MANAMI OGAWA, IWAO MATSUDA, U. of Tokyo — Recent work on metal films grown on semiconductor substrates has demonstrated that interfacial engineering in these systems can have profound effects on their properties. The structure of Ag films, grown on an array of atomic In chains on Si, has been shown to be modulated by the underlying chains, in the direction perpendicular to them. These modulations are found to persist in films with a thickness as great as 30 monolayers. It was proposed that a periodic insertion of stacking faults in the Ag film lattice allows the periodicity of its lattice structure to match that of these modulations [1]. We have conducted surface x-ray diffraction experiments to further elucidate the structure of this system. We have taken reflectivity data to provide detailed information about the out of plane structure and reciprocal space maps to determine the structure of the unit cell of these films for a number of different coverages. The results of this study confirm the existence of stacking faults and reveal further changes in the structure as the film thickness is increased.

[1] T. Uchihashi et al., Phys. Rev. Lett. 96, 136104 (2006)

Aaron Gray
U. of Illinois Urbana Champaign

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