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NISXW study of Si adsorbed on an Al-Co-Ni quasicrystal NICK STANISHA, Penn State University, ANINDITA CHAUDHURI, University of Warwick, JULIAN LEDIEU, Institut Jean Lamour, CNRS, Ecole des Mines, Nancy Universite, HSIN LI, STEPHANIE SU, ANDREAS MAYER, Penn State University, KEVIN LOVELOCK, ROBERT JONES, University of Nottingham, LISA WEARING, University of Liverpool, DAVID WOODRUFF, University of Warwick, RENEE DIEHL, Penn State University — The normal incidence standing x-ray wavefield (NISXW) technique has never before been applied to the determination of adsorption structures on quasicrystals, even though it is quite clear that, under the right conditions, x-ray standing waves do exist in quasicrystals. This omission may be due to a misconception that the relationship between the phase of the standing waves and the atoms at a quasicrystal surface is arbitrary. We have performed a NISXW experiment for the adsorption of Si atoms on the nominally 10-fold surface of the decagonal Al-Co-Ni quasicrystal. NISXW spectra were obtained for a Si coverage of about 0.3, for two different angles of incidence: normal to the 10-fold surface, and at an angle of about 60◦ from the surface normal. These angles correspond to two strong x-ray reflections of the quasicrystal. The intensity of the Si 1s photoemission signal was measured in order to determine the location of the Si atoms.order to accurately model the 5-fold symmetry of the surface, our analysis employed a 200 Å x 200 Å x 8 Å structure model for the quasicrystal. The results indicate that the Si atoms have an average height of 1.80 Å above the surface, and are arranged in 6-atom pentagonal clusters centered at points of 5-fold symmetry. This study demonstrates the feasibility for using NISXW as a structural tool for adsorbed atoms or molecules on quasicrystal surfaces.

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