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Low-Energy Electron Diffraction Study of the Adsorption Geometry for Pb(111)-($\sqrt{3}$x$\sqrt{3}$)R30^o-K CHRISTOPHER M. LEMON, Department of Physics and Astronomy, Ohio Northern University, Ada, OH 45810, USA, F.M. PAN, Department of Physics and Materials Research Institute, Pennsylvania State University, 104 Davey Laboratory, University Park, PA 16802, USA, MELLITA CARAGIU, Department of Physics and Astronomy, Ohio Northern University, Ada, OH 45810, USA, NICOLA FERRALIS, RENEE D. DIEHL, Department of Physics and Materials Research Institute, Pennsylvania State University, 104 Davey Laboratory, University Park, PA 16802, USA — Both the clean Pb(111) structure and the ($\sqrt{3}$x$\sqrt{3}$)R30^o structure formed by potassium adsorbed on Pb(111) have been investigated by dynamical low-energy electron diffraction (LEED). The relaxation of the topmost lead layers of the clean Pb(111) surface is the main deviation from the bulk geometry, in agreement to the results of a similar study [Y.S. Li, F. Jona, P.M. Marcus, Phys. Rev. B 43 (1991) 6337]. Upon adsorption of K at room temperature, a ($\sqrt{3}$x$\sqrt{3}$)R30^o structure is formed with K atoms occupying substitution sites. This result is rather unexpected considering that intermixing is unusual for large alkalis (larger than Li) adsorbed on close-packed substrates. The current calculation finds a K-Pb bond length of 3.62±0.3Å, with no significant change to the Pb interlayer spacings [F.M. Pan, M. Caragiu, N. Ferralis, R.D. Diehl, Surf. Sci. 600 (2006) 537].

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