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Low Energy Electron Diffraction Structural Analysis of Au(111)-(5x5)-7S STEPHANIE ASH, MELLITA CARAGIU, Department of Physics and Astronomy, Ohio Northern University, Ada, OH 45810, GARRY MCGUIRK, HEEKEUN SHIN, RENEE DIEHL, Department of Physics and Materials Research Institute, Pennsylvania State University, University Park, PA 16802 — The clean Au(111) surface is known to undergo several structural changes when exposed to adsorbates, in particular sulfur. As the sulfur coverage increases towards 1ML, the structure of the gold (111) surface has been observed to go through a range of changes as follows: unreconstructed (1x1), followed by a (5x5)-7S structure, then a ($\sqrt{3}$x$\sqrt{3}$)R30°-S phase, and eventually an incommensurate "complex" phase. The current LEED study focuses on the intermediate Au(111)-(5x5)-7S phase. The 7 sulfur atoms in each unit cell are found to occupy fcc hollow sites. There is considerable rumpling of the sulfur adsorbed layer, as well as the top gold layers in the surface, which results in an average S-Au distance of 1.54±0.06Å, followed by the next Au-Au average interlayer spacing of 2.37±0.01Å. When comparing the latter value to the bulk interlayer spacing of clean gold, of 2.35Å, a slight expansion is noticed. The results are compared to the structural information obtained by other studies of the same Au(111)-(5x5) phase.

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