A LEED analysis of the Au(110)-Sb Phases

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The adsorption of antimony on the Au(110) face induces many different surface reconstructions. The low solubility of Sb in Au (bulk) favor the Sb atoms to stay at the surface, where can be formed a Sb-Au surface alloy or an ordered Sb overlayer. Two of the observed Au(110)-Sb reconstructions can be easily obtained experimentally: the c(2x2) and (√3x√3)R54.7° phases.

In this work, the results of a LEED analysis of both surfaces will be presented and discussed. A LEED experiment has been performed where Sb atoms were deposited on a clean, smooth and well ordered Au(110) surface. After annealing the sample, Au(110)c(2x2)-Sb or Au(110)-(√3x√3)R54.7°-Sb phases were obtained showing sharp and well defined LEED patterns.

The theoretical simulation has been performed using the SATLEED package [1] and the preliminary results obtained for the Au(110)Sb-c(2x2) indicate the presence of Sb atoms in hollow sites as an overlayer, differing from the prediction of a substitutional structure [2]. For the Au(110)Sb-(√3x√3)R54.7° phase our results shown the occupancy of the hollow sites by antimony atoms, as predicted by SXRD analysis [3].

So far the best Pendry R-factors [4] obtained in our analysis are R_p= 0.28±0.07 for the c(2x2) phase and R_p= 0.21±0.05 for the (√3x√3)R54.7° phase.

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