【SP-05】

Determination of In/Si(111)-4x1 phase coverage and bias dependent STM images

Sangyong Yu, Geunseop Lee*, Hanchul Kim, Ja-Yong Koo, Hyung-Ik Lee, Dae Won Moon
Korea Research Institute of Standards and Science

Adsorption of In on Si(111) induces a number of phases with different LEED patterns. Among them, a 4x1 phase has attracted many interests since it consists of quasi-1-dimensional atomic chains and shows a temperature-dependent phase transition. Recently, a structural model with 1 ML In has been proposed and supported by theoretical calculations. While this model is considered to be most favorable, there also exist other structural models, based on the estimation of the In coverage other than 1 ML. Absolute determination of the In coverage is essential to determine the structure correctly, but it has been absent so far.

We determined the In coverage of the 4x1-In surface in an absolute way by combining scanning tunneling microscopy (STM) and medium energy ion scattering(MEIS), The In coverage is measured to be 0.99+-0.1 Ml, supporting the 1 ML-In model. We also present bias dependence of STM images and compare with theoretical simulations from the 1 ML-In model.

*Corresponding auther