

**[S-02]**

## STM studies of Bi-epitaxy on Si(1 1 4)-2x1

조상희, 서재명  
전북대학교 물리학과

The Bismuth (Bi) adsorption on the reconstructed Si(114)-2x1 has been studied using STM under UHV. Among 1-D features of Si(114)-2x1, such as Tetramer, Dimer and Restatom rows parallel to [-110] direction, Bi atoms preferentially adsorbed on the Tetramer rows and formed 1-D wires whose separation is 1.6 nm. The periodic structure in the Bi wire along [-110] has been converted to 3a (a=0.38 nm) from 2a of clean Si(114). However, such periodicity converts from 3a to 2a as the Bi starts to grow as a 2-D layer. The Bi wire of the second layer adsorbs between the Bi wires of the first layer, and shifts by 'a' along the row. The Bi wires of subsequent layers also adsorb between the previously formed Bi wires in the same fashion. Such epitaxial growth continues unless the defects like substrate vacancies interfere. The packing unit is a Bi-dimer and the hexagonal packing has been confirmed by the hexagonal pattern of the facet near the ledge. It has been concluded that the reasons for 2-D epitaxial growth of Bi on Si(114) are the followings; the first, the existence of preferential adsorption site on Si(114), and the second, the adjustable lattice-matching between the Bi-dimer row and the substrate along as well as perpendicular to the wire.