

STM Study on $c(4\times 4)$ Reconstruction of Si(100)

Jae Yeol Maeng, Sehun Kim

Department of Chemistry

Korea Advanced Institute of Science and Technology

We have studied the atomic structure of Si(100)- $c(4\times 4)$ reconstruction using scanning tunneling microscopy (STM). The $c(4\times 4)$ reconstruction can be formed by annealing the hydrogen exposed surface at temperatures between 850 and 960 K. At this temperature range, adsorbed hydrogen atoms are all desorbed. Therefore, the $c(4\times 4)$ reconstruction is due to the Si dimers on surface. The filled and empty state images of the STM were interpreted in terms of Si dimers in $c(4\times 4)$ primitive cell forming the reconstruction. Based on the STM images and hydrogen adsorption experiment on $c(4\times 4)$ surface, we suggest that Si dimers in $c(4\times 4)$ unit cell are perpendicular to the underlying Si dimer rows.