SF-003

Oxygen-Induced Pendulum-Like Motion of an Adatom on Si(111)-7X7

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We investigated the dynamics of thermal motion of Si adatom-like features on Si(111)-7x7 using scanning tunneling microscopy at room temperature, which were produced by dosing a small amount of oxygen onto a clean surface. STM images show a pendulum-like motion of a center adatom with a pivot point located at an adjacent vacant center adatom site. Energy barrier of pendulum like motion is obtained though Arrhenius plot. We used Atom-tracking method.

SF-004

Novel Energy Transfer Mechanism in Bisolitons on Si(100) surface

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We developed single carrier spectroscopy and controllable arbitrary waveform to study solitons made up of phase kinks that resulting from the creation of local Si(100)-p(2×2) structure in the ground state of Si(100)-c(4×2). The programmed bias pulses to Si surface and the yield related to respective pulses shows that the solitons were not induced by the direct excitation caused by tunneling electrons but the decay of quantumwell state, produced by abrupt field switching. When the sample bias suddenly changes from positive to opposite, electrons near the quantum well move to compensate the non-equilibrium charge distribution and fill the quantum well. The decay of the quantum well provides excess energy to induce structural transition, the lifetime of the quantum well can be deduced from the soliton creation yield. The lifetime was increased with the bias and was on the order of a few hundred *n*sec. Such a fine control of bias pulse can be used to make artificial nano structure like 1 dimensional chain or laterally linked bisolitons.