[S-08]

Adsorption and Ordering of Acetic Acid on the Ge(100)-2x1 Surface

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The adsorption of acetic acid molecule onto the Ge(100) - 2x1 surface was investigated using both scanning tunneling microscopy (STM) and temperature programme desorption (TPD). Acetic acid is dissoicated to form the acetate(CH_3COO) and atomic (H) on Ge(100) at room temperature. Adsorption mechanism is Nucleophlic / Electrophilic addition by Ge-O dative bonding on the Ge dimer atom. There are interdimer interactions between the adsorbates. At low coverage, adsorbates show bright protrusions which are located only on the Ge up dimer. We found that acetic acid molecules adsorb with very high order on Ge(100) saturation coverage. Figure 1(a) shows a filled-state STM image (V_s= - 2.0 V) of Ge(100) surface at the saturation coverage. Annealing up to 500K, long range periodicity are formed. The orientation of ordering prefer to decrease repulsive interaction between adsorbates. Figure 1(b) shows an empty image (V_s= + 2.0 V) of Ge(100) surface after annealing Figure 1(a). Thermal desorption spectra for CH_3COOD on Ge(100) reveals D_2 desorption peak at 600K. This observation confirms the dissociative adsorption of CH_3COOH.

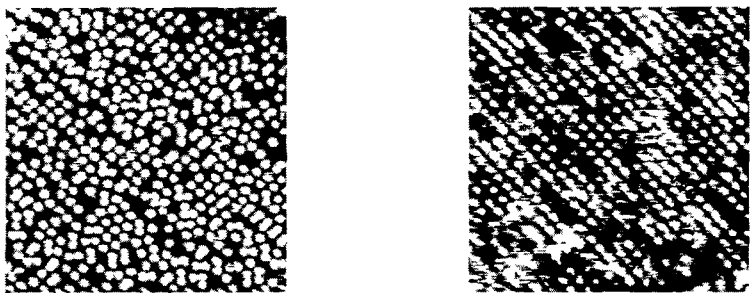

Figure 1. (a) The filled state image (Vs=-2.0 V) of adsorption structure of acetic acid on Ge(100) surface at saturation coverage and (b) the empty state image (Vs=2.0v) after annealing (a) up to 500K.