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The adsorption structure of water molecule on Ge(100)

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The adsorption structure of water on Ge(100) has been investigated using real-time scanning tunneling microscopy (STM). In the STM images, the water molecules are shown as bright spot where O forms a bond to the down atom of the Ge dimer. Among adsorbed water, some are desorbed and others are dissociated at room temperature. The dissociation of water molecules into OH and H species, shown as dark dimer in STM image, is energetically favored over the molecular adsorption similar to the case of water on Si(100). We have frequently observed a structural transformation of water molecule from a single protrusion to a dark dimer. However the energy barrier for water dissociation on Ge(100) is larger than it on Si(100). Since the molecular adsorption on Ge(100) has a relatively smaller adsorption energy compared to that on Si(100), adsorbed water molecules on Ge(100) prefer desorption rather than dissociation. This result is a good agreement with the previous spectroscopic observations and calculation about water on Ge(100).

[참고문헌]

1. J. Cho, L. Kleinman, K. Jin, and K. S. Kim, "Theoretical study of water adsorption on the Ge(100) surface" Phys. Rev. B 66, 113306 (2002).