STM/STS study on confined electronic states of glycine/Cu(111) supramolecular nanoporous structure

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Formation and control of the novel low-dimensional structures and their electronic properties, by using self-assembled structure of organic molecules, is one of the goals of our current researches [1,2]. As a step, we have performed scanning tunneling microscopy/spectroscopy (STM/STS) study on the self-assembled monolayers of the simplest amino acid, glycine molecules, formed on a Cu(111) surface. All STM/STS measurements were performed at 5 K using an electrochemically sharpened tungsten tip (\( \phi = 0.3 \) mm).

As shown in Fig. 1, adsorbed glycine molecules formed nanoporous structures with a unit of glycine trimers. Although the area surrounded by six trimers (A) is a bare Cu surface like the outside substrate (B), STS results measured on both surfaces showed a complete difference from each other for the bias voltages of \( V_s > -0.4 \) V. The electronic structures observed for the nanoporous area indicated the formation of a quantum confinement structure on Cu(111). Details of the results and the ability of the structure as a template for fullerene molecules will be discussed at the conference.

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References