Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Local Investigation in Dynamic Behavior of Excited Water Nanoclusters on Cu(111) Surface[1] YANG GUO, HUIQI GONG, LI DONG, LAILAI LI, JINCHUAN WANG, XINYAN SHAN, XINGHUA LU, Chinese Academy of Sci (CAS) — Dynamic behavior of water molecules on surfaces is important for surface-mediated water dissociations and reactions. Here we present investigations in dynamic behavior of excited water nanoclusters on Cu (111) surface by using a low temperature scanning tunneling microscope (STM). It is found that excess electrons in a single water nanocluster can be injected from a metallic STM tip under a positive voltage. Such injection of electrons results in both the diffusion of single H_2O molecules within the nanocluster and directional diffusion of water nanoclusters on surface. The range of lateral diffusion is limited to several nanometers from the tip because of the electrical screening effect from Cu substrate for the excess electrons in the nanocluster. In addition, femto-second laser pulses are employed to excite the water nanoclusters during STM imaging with tip in the tunneling condition. Significant changes in topographic profile of H_2O nanoclusters are observed under the photoexciation, as compared with that of the nanoclusters in the ground state. The results obtained in this study provide a microscopic understanding of the diffusion mechanism of excited water nanoclusters on surface.

[1]the National Science Foundation of China (Grant No. 11174347, 61376100) and the Ministry of Science and Technology of China (Grant No. 2012CB933002).

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Date submitted: 12 Nov 2013 Electronic form version 1.4