

Abstract Submitted  
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**Reversible vertical manipulation of Ag atoms on Si(111)-(7 $\times$ 7) at room temperature** FANGFEI MING, KEDONG WANG, SHUAN PAN, JIEPENG LIU, XIEQIU ZHANG, JINLONG YANG, XUDONG XIAO, DEPARTMENT OF PHYSICS, THE CHINESE UNIVERSITY OF HONG KONG, SHATIN, NEW TERRITORY, HONG KONG, CHINA TEAM, HEFEI NATIONAL LABORATORY FOR PHYSICAL SCIENCES AT MICROSCALES, UNIVERSITY OF SCIENCE AND TECHNOLOG TEAM — We have demonstrated a technique to conduct reproducible and reversible vertical manipulation of Ag atoms on the Si(111)-(7 $\times$ 7) surface at room temperature using a scanning tunneling microscope tip. The direction of the transfer of Ag atoms between the sample surface and the tip is simply controlled by the polarity of the bias voltage. Using the 7 $\times$ 7 unit cell as a nanometer size template, complex Ag nano-clusters could be assembled or disassembled by adding or removing Ag atoms in an atom-by-atom manner. With controlled number of Ag atoms filled in a half unit cell, we can construct Ag clusters with up to 25 Ag atoms. The precise control of the number of Ag atoms in the Ag clusters can provide critical information for understanding their physical and chemical properties, and form a fundamental base for the relevant studies of the Ag/Si(111)-(7 $\times$ 7) system and for fabricating nano-devices.

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