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Conversion among Co adsorption states on Si(111)-(7×7) by atomic manipulation QIN LIU, KEDONG WANG, GUOHUA ZHONG, FANGFEI MING, XUDONG XIAO[1], Department of Physics, The Chinese University of Hong Kong, Shatin, New Territory, Hong Kong, China — Eight types of adsorption structure of single Co atom have been identified by comparing scanning tunneling microscopy (STM) images of Si(111)-(7×7) surface before and after in situ Co deposition at room temperature. The adsorption of single Co atom causes silicon adatoms appearing dimmer or brighter than their symmetry equivalents. Density functional theory calculations are performed to find the possible adsorption sites of Co atom and the magnetic moments of each type of adsorption structure, showing that the magnetic moments of the eight structures are different. Furthermore, atomic manipulation method has been used to realize conversions among the various Co adsorption structures. We have demonstrated that the single Co atom in eight different structure on Si(111)-(7×7) surface can be converted to each other directly or indirectly. Therefore, it makes this single Co/Si(111)-(7×7) become a promising system for building practical atomic magnetic structures for quantum computing since that each kind of single Co atom structure represents different magnetic states.

[1]Center for Photovoltaic Solar Cell, Shenzhen Institute of Advanced Technology, Shenzhen, China

Qin Liu
Department of Physics, The Chinese University of Hong Kong,
Shatin, New Territory, Hong Kong, China

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