

(SP-11)

Phase Manipulation at quasi-1D Metal-Insulator Transition using Scanning Tunneling Microscopy

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Electronic switching between insulating and metallic phases is the physical principle of the field effect device concepts being actively explored at the moment.¹ Here we demonstrate the reversible manipulation of the metal-insulator transition utilizing local electric field applied by the probe tip of scanning tunneling microscopy and the intrinsic bi-stability of the nanometer-scale domains. The hysteresis behavior is observed by tip height measurements over a fixed point at surface as a function of the sample bias, under the constraint of constant tunneling current. This opens the possibility of future device applications based on field-induced switching of metal-insulator phases in nano-scale.

[참고문헌]

1. C. Ahn, J. Triscone, J. Mannhart, *Nature* 6952, 1015 (2003)