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Diffusivity control in molecule-on-metal systems using electric fields Y.Y. ZHANG, N. JIANG, S.X. DU, H.-J. GAO, Institute of Physics, Chinese Academy of Sciences, MATTHEW J. BECK, SOKRATES T. PANTELIDES, Department of Physics and Astronomy, Vanderbilt University — Electronic devices constructed from molecule-on-metal systems are actively being explored for applications in logic and memory devices, sensors, fuel cells, and solar cells. The implementation of practical molecular electronic devices requires molecule-on-metal systems in which the arrangement of active molecules is fixed or can be controlled and the contact-molecule-contact system exhibits desirable electronic properties. Fe (II) Phthalocyanine (FePc) on Au (111) exhibits a number of promising electronic properties, but diffuses rapidly at room temperature. Using scanning tunneling microscopy and density functional theory calculations we show that applied electric fields can be employed to enhance or retard the diffusivity of FePc molecules on Au (111) independent of temperature. These results demonstrate the possibility of dynamic field-guided patterning of molecule-on-metal systems.

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