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Low Temperature STM Investigation of Molecular Kondo Effect
GAYANI PERERA, VIOLETA IANCU, SAW-WAI HLA, Ohio University — We investigate site-dependent Kondo effect on TBrPP-Co molecules on a Cu(111) surface at 4.6 K using scanning tunneling microscopy and spectroscopy [1]. The TBrPP-Co molecule has a spin-active cobalt atom caged at the center of porphyrin unit and four bromo-phenyl groups are attached to its four corners. On Cu(111), the molecules can anchor on the surface with either planar or saddle conformation [2]. For the current study, we choose only planar type molecules, in which the porphyrin unit is lying parallel to the surface and the molecule binds through the surface via four bromo-phenyl units as well as central porphyrin unit. The Kondo temperature of 170 K is measured above the cobalt atom location, i.e. at the center of the molecule. The observed Kondo effect is caused by spin-electron coupling between the cobalt atom of the molecule and the free electrons from the surface [2,3]. We find that the Kondo effect observed here is contributed from both surface and bulk states of Cu(111). This work is supported by the US Department of Energy Basic Energy Sciences grant no. DE-FG02-02ER46012. [1] G. Perera, V. Iancu, Luis G.G.V. Dias da Silva, S.E. Ulloa, and S.-W. Hla. Submitted. [2] V. Iancu, A. Deshpande, and S.-W. Hla, Nano Lett. 6 (2006) 820-823. [3] V. Iancu, A. Deshpande, and S.-W. Hla, Phys. Rev. Lett. (2006) in press.

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