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Electronic properties of precious-metal coated W tips in STM: Role of spin-orbit coupling[1] T. YAMASHITA, T. AKIYAMA, K. NAKAMURA, T. ITO, Mie U., S.H. RHIM, A.J. FREEMAN, Northwestern U. — Scanning tunneling microscopy (STM) has proved a versatile tool invigorating many physics at an atomic scale, where chemical identity and shape of the probe tip greatly affect resolution and sensitivity. There have been many efforts to functionalize STM tips: coating W tips with organic molecules and *3d* transition metals, which facilitate the selective imaging with enhanced tunneling current. In this work, we model W(110) tips coated by precious metals such as Au, Ag, and Pt, in which large spin-orbit coupling significantly influences the electronic structure of the STM probe. Furthermore, we argue that this spin-orbit coupling can be used as a spin detecting STM probe without additional bias switching. The stability of the W(110) apex atom for each metal coating is also discussed.

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