# Study of copper oxide by STM and nc-AFM

**S. Matencio**, C. Ocal and E. Barrena
E-mail: ebarrena@icmab.es

Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, 08193 Bellaterra, Spain.

Energy alignment between metal oxides and molecules has been shown to be crucial for their use as low-resistance contacts in organic devices [1]. Moreover, ultrathin films of semiconductor materials can be used as electric decoupling layers between a metallic substrate and organic molecules deposited on it to investigate the electronic properties of the independent molecules as well as the interaction between them. Here, we present the first stages of the growth of ultrathin copper oxide ($Cu_2O$), a p-type semiconductor with catalytic properties, to obtain laterally heterogeneous substrates consisting of metal and oxide regions. The copper oxide submonolayer has been grown at the step edges of Cu(111) by air injection and annealing in UHV [2-4]. Different oxide structures have been observed depending on the stoichiometric oxygen/copper ratio which has been characterized by STM and nc-AFM before and after deposition of a monolayer of molecules to investigate the influence of the oxide layer from comparison of molecule/metal oxide and molecule/metal electronic properties.

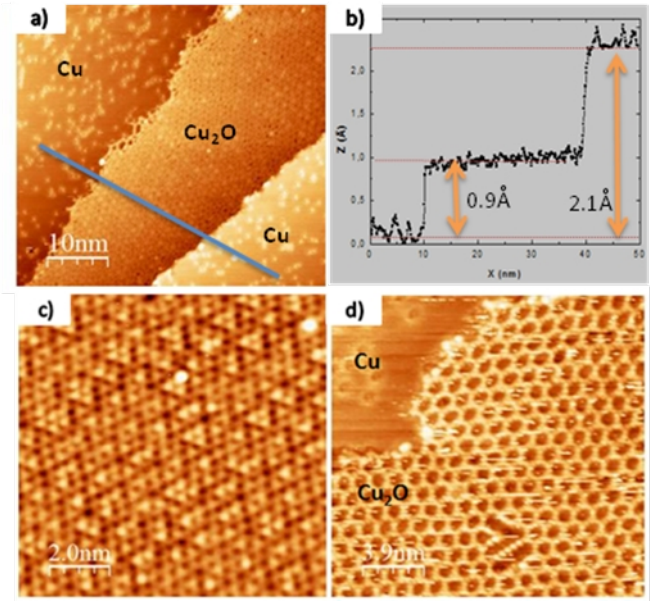


**Figure:** STM images of different structures of $Cu_2O$/Cu(111). (a) Image of $Cu_2O$ grown in the copper step and (b) its step profile. (c), (d) Different structures depending on the quantity of oxygen.

## References

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[3] C. Pérez León, *Physical Review B* **85**, 035434 (2012).
[4] F. Wiame, *Surface Science* **601**, 1193-1204 (2007).