Comparing graphene growth on Cu(111) vs. oxidized Cu(111)

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The epitaxial growth of graphene on catalytically active metallic surfaces via chemical vapor deposition (CVD) is known to be one of the most reliable routes towards high quality large-area graphene. This CVD-grown graphene is generally coupled to its metallic support resulting in a modification of its intrinsic properties. Growth on oxides is a promising alternative that might lead to a decoupled graphene layer. Here, we compare graphene on a pure metallic to graphene on an oxidized copper surface, in both cases grown by a single step CVD process under similar conditions. Remarkably, the growth on copper oxide – a high-k dielectric material – preserves the intrinsic properties of graphene; it is not doped and a linear dispersion is observed close to the Fermi energy. Density functional theory calculations give additional insight into the reaction processes and help explaining the catalytic activity of the copper oxide surface [1].

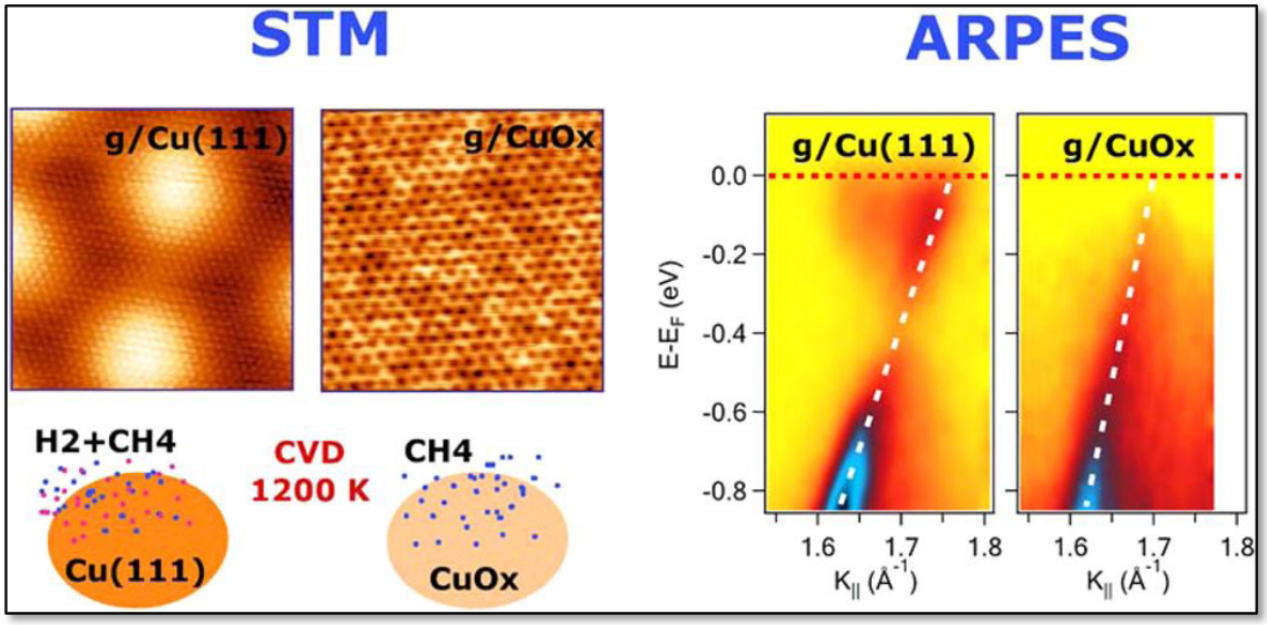

Figure caption: STM and ARPES measurements comparing graphene grown on Cu(111) and oxidized Cu(111), respectively. In both cases, graphene was grown in a single step CVD process.

[1] S. Gottardi et al., Nano Lett. **15**, 917 (2015).