

Observation of novel 2D monolayer based on CuO.

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impurity atoms in the formation of stable 2D CuO cluster with unexpected orthogonal crystal lattice.

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Recent discovery of graphene initiated the extensive investigation of study of other two-dimensional materials of different compounds and, in particular with nonlayered bulk structure such as boron, zinc oxide, sodium chloride or iron [1,2]. Among all these materials the latter one attracts special attention because the formation of two-dimension layered metal is unexpected and controversial due to the indirect nature of metallic bonds.

Here we present results of investigation of novel monolayer based on CuO with unexpected squared crystal structure by experimental and theoretical methods. Using in situ scanning transmission electron microscopy (STEM) it was observed special crystal lattice of 2D CuO on graphene which structure is principally different from the former reports.

Using DFT the stability and properties of observed CuO nanoclusters was studied. It was defined a critical role of the oxygen