

Publication

Anchoring of a dye precursor on NiO(001) studied by non-contact atomic force microscopy

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The properties of metal oxides, such as charge transport mechanisms or optoelectronic characteristics, can be modified by functionalization with organic molecules. This kind of organic/inorganic surface is nowadays highly regarded, in particular, for the design of hybrid devices such as dye sensitized solar cells. However, a key parameter for optimized interfaces is not only the choice of the compounds but also the properties of adsorption. Here, we investigated the deposition of an organic dye precursor molecule on a NiO(001) single crystal surface by means of non-contact atomic force microscopy at room temperature. Depending on the coverage, single molecules, groups of adsorbates with random or recognizable shapes, or islands of closely packed molecules were identified. Single molecules and self assemblies are resolved with sub-molecular resolution showing that they are lying flat on the surface in a trans-conformation. Within the limits of our Kelvin probe microscopy setup a charge transfer from NiO to the molecular layer of 0.3 electrons per molecules was observed only in the areas, where the molecules are closed packed.

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