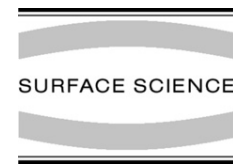




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Small Cu-clusters on ZnO(0001)–Zn: Nucleation and annealing behavior

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Abstract

The formation of (111)-oriented Cu-clusters on ZnO(0001)–Zn at room temperature is followed by in situ applied scanning tunneling microscopy. Kink-sites at step edges and especially the apexes of triangular ZnO-substrate terraces act as preferred nucleation sites. At room temperature the decay of small Cu-islands takes place on a time scale of minutes. Larger Cu-coverages lead to an ensemble of interconnected 3D-islands of uniform height separated by trenches down to the substrate. A disordered dislocation network is visible on top of the Cu-islands. Annealing leads to a piling up of the Cu-islands. An initially undisturbed ZnO-substrate in between the islands shows that there is no strong reaction between the Cu-clusters and the oxide at room temperature. A strong decrease of the adlayer coverage visible above the ZnO-substrate layer for annealing temperature above 570 K points to a partial entrenching of the islands into the oxide support and an alloy formation.

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