

The cerium oxide was deposited by reactive vacuum evaporation on the (111) surface of copper single-crystal in oxygen atmosphere at constant substrate temperatures of 25°C, 300°C and 450°C and at increasing temperature from 25°C to 450°C. In each case, the cerium oxide grew epitaxially with the (111) plane parallel to the substrate. The lattice parameter of the oxide increased up to the value of 5,28 during the deposition. At increasing temperature the growth of additional three-dimensional domains with tetrafold symmetry and (100) plane parallel to the surface was observed. Lattice parameter of these domains exhibited the value of 5,36 in the direction parallel to the surface. These domains were also observed by STM.

The palladium grew on the cerium oxide surface in form of epitaxial islands having (111) epitaxial plane parallel to the substrate surface. The palladium deposition resulted in the partial reduction of the oxide layer. The reduction was caused by the interaction of the palladium and oxygen atoms leading to the formation of PdO phase. This feature became more pronounced during annealing at 300°C. Annealing at higher temperatures led to coalescence of the palladium islands and thermal induced decomposition of the palladium oxide.