

In this work a reversible transition between $\text{CeO}_2/\text{Cu}(111)$ and $\text{Ce}_2\text{O}_3/\text{Cu}(111)$ was studied by metallic ceria evaporation and oxygen exposition. Prepared layers were characterised by XPS, ISS (and its angle resolved modification), LEED and XPD combined with computer modelling using EDAC code. Four reconstructions were identified within the transition - $(\sqrt{7} \times \sqrt{7})\text{R}19.1^\circ$, $(\sqrt{3} \times \sqrt{3})\text{R}30^\circ$, 3×3 and 4×4 - for which structural models were suggested. Prepared layers of $\text{Ce}_2\text{O}_3/\text{Cu}(111)$ exhibiting the 4×4 reconstruction were identified as a cubic phase of Ce_2O_3 by the combination of all methods. The photoelectron spectroscopy study of the chemical state of layers revealed that reduction proceeds from the surface and oxidation is realised by oxygen diffusion into the volume.