

Desorption dynamics of oxide nanostructures fabricated by local anodic oxidation

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We studied the properties of GaAs-oxides which were grown by local anodic oxidation (LAO) using an atomic force microscope with conductive tip. We find that the LAO-structures desorb under irradiation with soft X-rays (130 eV). We analyzed the desorption process in detail by time-resolved photoelectron spectroscopy. We observe that even in the first stages of light exposure the LAO-oxide is mainly composed of Ga₂O, with a small fraction of Ga₂O₃ and As-oxides. The As-oxides are located only in the surface layers of the LAO-oxide where they account for 10% of the oxide. Within 160 minutes of exposure they completely desorb. Moreover, we find evidence for the presence of unoxidized GaAs homogeneously distributed in the LAO-oxide.