

Abstract

The structure and morphology of nanostructured samples is being examined with Transmission Electron Microscopy (TEM). These samples are the initial part of the project that its final goal is the growth of an array of silicon nanowires through porous anodic alumina template. The Si nanowires array is used as an active layer in photovoltaic devices.

The samples are divided into two categories, the substrates and the final samples. First the substrates are studied in plane view, in order to reveal their structure after electroless deposition of Pt onto a p-type Si wafer with different growth parameters. Afterwards the final samples are studied in cross section. These samples constitute of a PAA film that is grown after anodization of an initial Al film which was deposited onto the substrate. The samples have different growth parameters also.

From the study we observe that after the electroless deposition of Pt onto Si substrate, a thin film of PtSi is grown, which is amorphous and homogenous and its thickness depends from the duration of the procedure. Also polycrystalline clusters are being observed but their structure cannot be determined precisely. In the two final samples the porous alumina film is observed and it is composed by parallel porous perpendicular to the substrate. The barrier layer in each pore bottom is obvious in the first sample while in the other is much thinner. In addition the pores are open in the areas where the clusters exist. The results of the structural characterization are consistent with the anodization curves (current density vs time) of the samples.

Keywords: PAA template, Si nanowires, electroless deposition, TEM, HRTEM