



GEMaC

Groupe d'Étude de la Matière Condensée

SPECTROSCOPIC ELLIPSOMETRY OF ANISOTROPIC NANOCOMPOSITE METAL /DIELECTRIC SYSTEMS SUBJECTED TO OXIDATION/REDUCTION PROCESSES

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I will present the ellipsometric study of the system of cobalt nanowires embedded in ceria matrix on strontium titanate substrate. This work was performed in the frame of ANR project “EMA”. The spectroscopic ellipsometry is a very powerful technique to study the complex dielectric function of pure or composite materials. However validity of the obtained result is strongly dependent on the correctness of used model. Another degree of complexity appears when the temperature is variable because most of the parameters such as refractive index, thickness, or strain are temperature dependent.

In the first part I will introduce the basics of ellipsometry, the effect of the surface roughness on the measurement, and models for description of media with nanoparticle

inclusions. The effect of the sample optical anisotropy will be analyzed. This theoretical part will be accompanied with step by step analysis of experimental data.

The second part will cover the problematic of high temperature ellipsometry, technical difficulties encountered during the implementation and result of temperature studies of strontium titanate substrate and ceria layers, and preliminary results of reduction /oxidation of cobalt nanowires.