
Christophe DEFRANOUX, Alexis BONDAZ, Laurent KITZINGER, Christine WALSH.

SOPRA
26 rue Pierre Jigniteaux, 92270 Bois-Colombes, France
christophe.defranoux@sopra-sa.com

Spectroscopic Ellipsometry is the technique of choice to characterise thickness and refractive indices of thin layers. Atmospheric Ellipsometry Porosimetry (EPA) measures the change of the optical properties and thickness of the materials during adsorption and desorption of wet air at atmospheric pressure. Concentration of humidity changes at each step of measurement from dry air to saturated air.

Set up of the instrument.

This non contact and non destructive technique is an effective and unique method to characterize porosity, pore size distribution (PSD) and Young modulus of thin porous films. It does not require to scratch the film, does not need low temperature or low pressure.

Detailed description of the technique will be exposed in the paper and several meso-porous films (with pore size larger than 1nm) using the Kelvin formalism will be presented. The porosity of the layer ranges from few percent up to 40%.

The influence of the extraction of CTAB in TEOS matrix (CS 10 material) with ethanol and thermal treatment will also be presented in this paper.

Refractive index changes versus the Relative Humidity.

As it is an optical method, it is non contact, non destructive, fast (down to 15 minutes) and room temperature method. It does require low pressure or any preparation of sample.

Pore size Distribution versus calcinations temperature of thin TiO2 films.

Using this technique, it becomes possible to characterize in term of porosity and pore size distribution the effect of thermal curing of thin films of TiO2 which is widely used in the photocatalysis and photovoltaic industries.


Other applications like Zeolite, Solid Oxide Fuel cell or others porous materials will also be introduced.

