CYCLE DE CONFÉRENCES DE CHIMIE

Avec le concours de : Manufacture Française des Pneumatiques MICHELIN
Sigma Clermont
Institut de Chimie de Clermont-Ferrand (ICCF UMR 6296)
U.F.R. S.T. Département de Chimie

Jeudi 9 juin à 16 h

Salle C

Nadhira LAIDANI

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Trento (Italy)

Synthesis processes and characterization of pure, doped transition metal oxide thin films and metal oxide-graphene hybrids

Thanks to their high transparency and environmental friendliness, pure or doped transition metal oxide-based films and nanostructures have emerged as important and promising materials for a wide range of applications such as photovoltaics, photocatalysis, solar thermal electricity, optoelectronics and electronics. Besides, metal oxide-graphene-based hybrid materials have attracted much attention due to unique chemical and physical properties.

Our recent studies focused on developing oxide films synthesis and doping processes by plasma route, their use in hybrid systems with graphene-based materials, their stoichiometry control, surface properties and defect identifying. To develop an appropriate understanding of the properties of these oxides, it was necessary to address the material preparation methods, the doping methods, structural and defect issues as well as their influence on the final performances.

The presentation will report first on TiO_2 and Nb-doped TiO_2 thin films synthesis processes, their stoichiometry control and defect identifying, in relation with their electrical and optical properties. Optical emission spectroscopy for plasma diagnostics was employed while the nature of the structural defects and the optical properties of the prepared films were characterized using X-ray diffraction, positron annihilation and X-ray photoelectron electron spectroscopies and UV-visible-NIR spectrophotometry.

New absorber coatings, consist of Nb–TiO_2 cermet layers for mid-temperature operation (300–350˚C) in collectors for solar thermal electricity plants will also be presented as well as our latest results concerning the interaction of monolayer graphene and graphene powders with Nb_2O_5 and TiO_2, associated with the structural and electron properties modification and the induced strain.

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