BENEMÉRITA UNIVERSIDAD AUTÓNOMA DE PUEBLA

INSTITUTO DE FÍSICA
"Luis Rivera Terrazas"

SEMINARIO
"DR. JESUS REYES CORONA"

"NANOGRANULAR MATERIALS OBTAINED BY GAS PHASE SYNTHESIS: MULTIMODAL MULTISCALE METROLOGY AND APPLICATIONS"

Dr. Luca Gavioli
Universidad Católica de Brescia, Italia.

The tunable properties of nanoparticles (NPs) brings nanostructured materials at the forefront in energy[1] catalysis[2] microbiology[3], and medicine[4] domains. When NPs are assembled in 3D structures with some degree of porosity one obtains nanogranular materials (NGM)[5]. Here the NP retains part of its properties, but the interaction with the surrounding environment opens the possibility to tailor the system properties from the nano to the microscale[6]. NGM synthesis is an outstanding challenge to which gas phase synthesis may provide a promising green and affordable solution, enabling the synthesis of metal NPs[5] and oxide NPs[7,8] on a wide variety of substrates[9]. The talk presents recent results on the synthesis and multimodal multiscale metrology of NPs and NGM obtained by gas phase deposition[10]. As shown in Fig.1, the electronic, morphological, mechanical and optical properties of NGM are unveiled to explain the behavior of the NGM for different applications such as antimicrobial coatings[3,11], transparent conductive oxides[1], photoacoustic nanofluidic sensors[12] and distributed membranes for gas-separation[5].

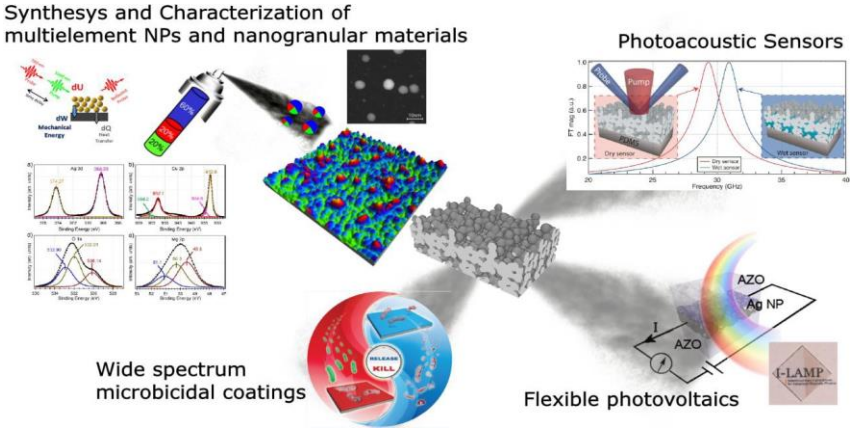

Fig.1 Schematic of NGM applications.

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