Fundamentals and Applications of Highly Porous Coatings Grown by Vacuum and Plasma-Assisted Techniques at Oblique Angles

Alberto PALMERO

Materials Science Institute of Seville (CSIC-US)

The oblique angle configuration has recently emerged as an invaluable tool for the deposition of porous thin films by vacuum and plasma-assisted techniques. In this presentation, an up to date description of its fundamentals and nanostructuration possibilities are given, along with numerous potential applications when these films are incorporated into functional devices. Overall, the large specific surface of the layers, associated to the existence of large open micro- and mesopores, make them ideal candidates whenever an interaction with a gaseous, solid or liquid medium is required. Applications in sensor devices, e.g. of cholesterol or glucose, or in biomedicine, where the film surface energy can be tailored to allow the growth of living cells while inhibiting bacterial proliferation, will be envisioned. Moreover, applications in optofluidics, where the optical response of multilayered structures (photonic crystals) may be tuned when different liquids pass through the porous channels, will be displayed. Results will be presented based on, but not limited to, the activities of the *Nanotecnology on Surfaces* research group, involving computer simulations, fundamental experiments aimed at tailoring the film porosity as well as the development of laboratory-size functional devices targeting specific sensor applications.