Multifunctional Photonic Materials for Energy, Sensing and Biomedical applications

Prof. Hernán Míguez

Macquarie University Visiting Fellow

Institute of Materials Science of Seville, Spanish National Research Council.

In this talk, I will describe different synthetic ways to attain periodical, aperiodical and random optical materials of controlled porosity, with applications in field as diverse as sensing, radiation protection, energy conversion or lighting. I will show how photonic structures of different kind can be used to control the optical absorption or emission of nanomaterials embedded within them, and how porosity provides the necessary means to make these materials selectively responsive to the environment. The processing versatility of these materials is demonstrated by realizing the first flexible self-standing biocompatible UV reflecting mirrors capable of efficiently shielding human skin cells against the genotoxic effect of solar radiation.

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