

JS1-TuM-INV.8 ADDED VALUE NANOSTRUCTURED COATINGS WITH TAILORED OPTICAL BEHAVIOUR. C. N. Afonso. Instituto de Optica, CSIC, Serrano 121, 28006 Madrid, Spain.

Optical coatings are generally formed by multilayer films whose spectral transmission / reflection are typically controlled through the number of layers, their refractive index and their thickness. However, current applications demand more functionalities such as selective operation depending on input conditions (intensity, polarization, etc...), tuneable or ultrafast response, and in many cases, several functions in the same coating. The design of the structure of the coating in the nanoscale is an attractive route to achieve this goal.

This presentation aims to show examples on how nanostructuring allows tailoring the properties of the film or coating to the desired applications. It will first be illustrated through the production of nanocomposite materials formed by metal nanoparticles embedded in a dielectric host that are known to exhibit optical resonances due to dielectric or classical confinement effects. These effects are responsible for colouring of many decorative glasses when the dimensions of the nanoparticles are much smaller than the wavelength of the light. Whereas bulk techniques usually disperse nanoparticles randomly, thin film technologies offer the possibility of organising nanoparticles in layers. This layered structure can be then designed in order to achieve the desired response. This concept can straightforwardly be extrapolated to other "dopants" such as ions or different hosts such as glasses or ceramics. Examples will be given on how the optical response of nanocomposite films /coatings can be tuned through the dimensions and separation of the nanoparticles, their "layered" distribution or the use of different hosts. Finally, the possibility of incorporating different functionalities in the same coating either through the use of different "dopants" or pairs "dopants"-host will be illustrated.