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Hybrid materials for diverse optical applications based on the one-pot occlusion of dyes into MgAPO-11

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The incorporation of photoactive molecules into ordered nanostructured systems is a growing field for the development of new functional materials. In particular, for optical applications in which optically very dense materials are needed, an appropriate strategy to avoid dye aggregations is dye-encapsulation into nanochanneled inorganic structures. In this work, fluorescence dyes are incorporated into a 1D-aluminophosphate by crystallization inclusion method, allowing a perfect fit between the molecular and channel dimensions. A good fitting between the pore size and molecular structure is relevant in order to avoid undesirable aggregates, to achieve a preferential orientation of the guest, and to minimize molecular motion. Thus, fluorescent capacity of the dyes can be ehanced, and anisotropic behaviour can be also envisaged. In this work, different chromophores, acridine (AC), Pyronine (PY) and LDS 722 dyes has been encapsulated into the 1Dnanochannels of MgAPO-11 aluminophosphate crystals (AEL structure). The final solid hybrid materials show interesting optical properties such as i) fluorescence colour switching depending on the direction of the polarizers upon UV light excitation, ii) white light emission materials and iii) NLO properties such as Second Harmonic generation (SHG) and 2-photon fluorescence signals under IR light excitation.

Biography

Iñigo López-Arbeloa (Ph.D. in Chemistry) is a Chemical Physics Professor in the University of the Basque Country (UPV/EHU). Currently researches in photophysics of dyes in different nanostructured materials, being interested in photonics applications as materials for active media of dye lasers, photoactive multifunctional hybrid materials for optical antenna for photovoltaic cells, photodynamic therapy nanoparticles, etc..

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