Laboratoire PPSM – UMR CNRS 8531

Photochimie et Photophysique Supramoléculaires et Macromoléculaires

Séminaire IDA

Jeudi 23 Mai 2013 - 16h00 - Auditorium D. Chemla - Bâtiment IDA

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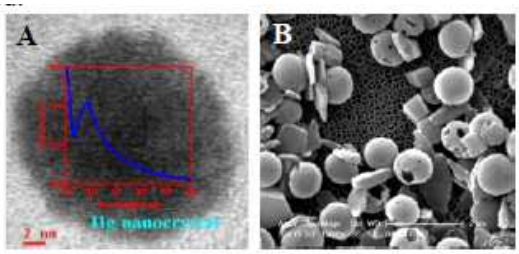
«Metal and Molecular Nanoparticles in Polymer Thin Films»

Polymer thin films are efficient matrices to stabilize nanoparticles; however, their potential utility as active matrices for the fabrication and utilization of metallic and molecular nanoparticles has not been extensively exploited. Polymer-metal nanocomposite thin films combine the unique characteristics of the components as well as manifest mutualistic effects. We will describe a soft chemistry within polymer thin films that facilitates the in situ generation of noble metal nanoparticles,[1] crystal-to-crystal transformation at the nanoscale, the fabrication of unusual materials like mercury nanodrops and nanocrystals (A)[2] and the range of applications of the nanocomposite thin films from nonlinear optics to sensing and catalysis.[3]

Development of simple protocols to tune molecular assembly and hence the materials responses can open up new avenues in the field of molecular materials; the amorphous phase offers a new dimension of exploration in this context. As an illustrative case, we consider diaminodicyanoquinodimethanes (DADQ) which show strong fluorescence enhancement from the solution to the crystalline solid state.[4] The amorphous-to-crystalline transformation of DADQ nanoparticles (B) partially confined by fixing in a polymer thin film[5] demonstrates the induction and control of molecular assembly at the nanoscale with significant consequences for fluorescence emission responses. Relevance of the amorphous phase to fundamental nucleation theories will be highlighted.



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