



Carbon Nanotube and Porphyrins:Materials for Optics and Energy Applications

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[SEARCH](#)[BROWSE](#)[BROWSE BY SYMPOSIUM](#)[AT-A-GLANCE](#)[AUTHOR INDEX](#)[CANCELED PRESENTATIONS](#)**932****(Invited) Carbon Nanotube and Porphyrins: Materials for Optics and Energy Applications**

Wednesday, 16 May 2018: 14:00

Room 203 (Washington State Convention Center)

M. Hanana (CEA-Saclay), G. Delport (Laboratoire Aimé Cotton, ENS Cachan), S. Le Gac (UMR CNRS 6226, ISCR, Université de Rennes 1), C. Voisin (Ecole Normale Supérieure), B. Jusselme (CEA-Saclay), B. Boitrel (UMR CNRS 6226, ISCR, Université de Rennes 1), J. S. Lauret (Laboratoire Aimé Cotton, ENS Paris Saclay), and S. Campidelli (CEA-Saclay)

The fabrication of functional hybrid materials that preserves and combines the properties of their building blocks is a central issue of nanosciences. Among the different classes of nanomaterials, carbon nanotubes are promising for electronics, opto-electronics, catalysis and composite applications. In this context the combination of nanotubes with porphyrins has been widely explored for catalytic^{1,2} or electron transfer purposes.^{3,4}

Here I present two results obtained recently on the nanotube/porphyrin composites, the first deals with the supramolecular organization in micelles of porphyrins around the nanotubes.⁵ In this work we were able to explain the Davidoff splitting observed on the absorption bands of the porphyrins by their organization around the nanotubes. The second deals with the synergic effect on catalytic activity of carbon nanotubes and strapped iron porphyrin hybrids for Oxygen Reduction Reaction (ORR).⁶ In particular, we demonstrated that the combination of both components - MWNTs and porphyrin - leads to a better catalytic activity than those of the nanotubes or the porphyrins taken separately. This study highlights the importance of the carbon support for the catalysis. The nanotubes ensure the availability of electrons to the porphyrin catalysts and allow the ORR to occur via the 4-electron pathway, avoiding the production of hydrogen peroxide.

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