Tetrathiafulvalene Modified Carbon Nanotube Hybrids For Photoinduced Electron Transfer Interactions

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Carbon-based nanostructures are currently one of the hottest research topics in science for producing innovative materials, composites, and electronic devices. The ability of carbon to exist in different allotropic forms has provided a variety of nanoscale size shapes with fascinating properties (i.e. fullerene, single and multi-walled carbon nanotubes, carbon fibers, carbon nano-onions, carbon nanohorns). Among this wide diversity of carbon nanomaterials, the unique electronic, physicochemical and mechanical properties of carbon nanotubes (CNTs) render them ideal candidates for molecular scale electronic applications.[1]
In this context, chemical functionalization is an especially attractive goal as it can improve solubility and processability of CNTs and allows the unique properties of CNTs to be coupled to those of other materials.[2]
With the long term objective of constructing versatile and functional nanosized ensembles for photoinduced electron transfer, we recently embarked on the preparation of donor-acceptor nanohybrids consisting of carbon nanotube units endowed with tetrathiafulvalene (TTF) or π-extended tetrathiafulvalene (exTTF) electron-donor moieties following different, covalent and non-covalent, approaches (Figure 1).[3]
Synthetic, spectroscopic and electrochemical results on these new nanostructures will be presented and discussed, along with photophysical properties of some of the aggregates formed.

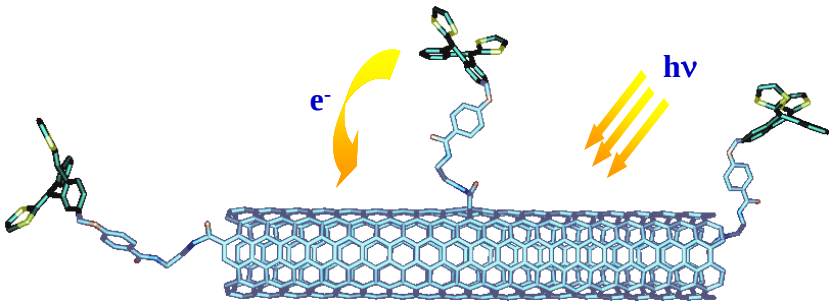

Figure 1. Covalent electron-donor-acceptor ensemble based on single walled carbon nanotubes and π-extended tetrathiafulvalene.

[1]. Special issue: "*Carbon Buckyballs to Nanotubes*", *Interface*,1**2006,** *15*, pags. 23-62.
[2]. A. Hirsch, O. Vostrowsky, *Top. Curr. Chem.*, **2005**, *245*, 193.
[3]. M. A. Herranz, N. Martín, S. Campidelli, M. Prato, G. Brehm, D. M. Guldi, *Angew. Chem. Int. Ed.*, **2006**, *45*, 4478.