NEW DIAZONIUM SALTS OF METAL COMPLEXES FOR ELECTROCHEMICAL MODIFICATION OF CARBON NANOTUBES.

Bruno Jousselme [a], Cédric Goyer [b], Martial Billon [b], Stéphane Guillerez [b], Gérard Bidan [c], E. Abou Hamad [d], Christophe Goze-Bac [d], Jean-Yves Mevellec [e], Serge Lefrant [e]

[a] RTB «Post CMOS moléculaire 200mm», LETI / DIHS / LIMN;
[b] DRFMC / SPrAM / LEMOH, UMR 5819;
[c] DRFMC / DIR,
CEA-Grenoble, 38054 Grenoble cedex 9, France.
[d] LCVN, University of Montpellier II, 34095 Montpellier, France.
[e] IMN / University of Nantes, 44322 Nantes, France.
bruno.jousselme@cea.fr

Carbon nanotubes (CNTs) present remarkable electronic, mechanical, optical and chemical properties, which open a way to future applications of these nanoobjects as materials for molecular electronics, energy storage, sensors, new composites etc... Covalent or non covalent functionalizations of CNTs are more and more used in materials science with the goal to improve their solubility and the ease of their deposition in forms suitable for various electronic devices. More specifically, appropriate functionalization of CNTs may prevent form undesirable phenomena such as phase separation etc. This, in turn, facilitates their insertion into polymer matrices frequently used for the fabrication of specific electronic, optical or biological sensors. Different ways have been developed to covalently functionalise CNTs,1 involving chemical, photochemical and electrochemical processes. Electrochemical methods present two main advantages as compared to the two others. First, electrochemical phenomena proceed via electrical addressing, thus they enable selective functionalization of those nanotubes are incorporated into the electrochemical circuit2. Second, the current of electrografting is directly correlated with the density of electrons generated onto the nanotubes surfaces which allows a control of the functionalization rate. In view of new applications of CNTs in optoelectronics there exists a strong demand for the development of electrochemically active systems containing chromophore groups. We present here a promising family of such compounds, namely new diazonium salts of metal complexes which combine electrochemical activity with strong absorbtion in the visible part of the spectrum. In particular, we describe the synthesis of diazonium salts of bipyridine or terpyridine metal complexes. The electrochemical depositions of these compounds are first tested on a vitrous carbon electrode and then extended to CNTs.

References:

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