**Copper hexacyanoferrate (CuHCF) functionalized SWCNTs for the solid-liquid selective extraction of cesium**

H. Draouil1,2,3,4, L. Alvarez4, J. Causse1, V . Flaud5, M.A. Zaïbi3, J.L. Bantignies4, M. Oueslati2 and J. Cambedouzou1.

1 Institut de Chimie Séparative de Marcoule, UMR 5257 CEA-CNRS-ENSCM-UM, BP17171, F-30207 Bagnols sur Cèze, France

2 Unité de nanomatériaux et photonique, Université El Manar, Faculté des Sciences de Tunis, Département de Physique, 2092 El Manar, Tunis Tunisia

3 Ecole Nationale Supérieure d'Ingénieurs de Tunis, Université de Tunis, 5 Avenue Taha Hussein, 1008 Tunis, Tunisia

4 Laboratoire Charles Coulomb (L2C), UMR 5221 CNRS, Université de Montpellier, F-34000 Montpellier, France

5 [Institut Charles Gerhardt Montpellier](http://www.icgm.fr/), UMR5253, Université de Montpellier, F-34000 Montpellier, France

**Abstract**

Single-walled carbon nanotubes (SWCNTs) are functionalized with copper hexacyanoferrate (CuHCF) nanoparticles to prepare solid substrates for the sorption of cesium ions (Cs+) from liquid outflows. The high mechanical resistance and large electrical conductivity of SWCNTs are associated to the ability of CuHCF nanoparticles to selectively complex Cs+ ions in order to achieve membrane-like buckypapers presenting high loading capacity of cesium. The materials are thoroughly characterized using electron microscopy, Raman scattering, X-ray photoelectron spectroscopy and thermogravimetric analyses. Cs sorption isotherms are plotted after having measured the Cs+ concentration by liquid phase ionic chromatography in the solution before and after exposure to the materials. It is found that the total sorption capacity of the material reaches 230 mg.g-1, and that about one third of the sorbed Cs (80 mg.g-1) is selectively complexed in the CuHCF nanoparticles grafted on SWCNTs. These high values open interesting outlooks in the integration of such materials in devices for the controlled sorption and desorption of these ions.