

α -Sexithiophene in Carbon Nanotubes for Raman-Based Applications

Nathalie Y-Wa Tang, Etienne Gaufrès, François Lapointe, Richard Martel

Regroupement Québécois sur les Matériaux de Pointe
(RQMP)
Département de Chimie, Université de Montréal,
Montréal QC H3T 1J4, Canada

In recent years, encapsulating organic molecules into carbon nanotubes has attracted much attention. It has been clearly shown that molecules inside the CNT are protected from degradation. In this study, we investigated using Raman spectroscopy the encapsulation of α -sexithiophene (6T) into single-walled carbon nanotubes (SWNTs) via a liquid phase. Our results exhibit similar properties as 6T@SWNT obtained by sublimation. Raman performed on individual 6T@SWNTs, one metallic and one semi-conductor, and bromophenyl-functionalized 6T@SWNTs demonstrate that the Raman signal of the 6T is unaffected by the nanotube resonance or by covalent chemical functionalization of the nanotube sidewall. The results also show that the Raman diffusion of the encapsulated molecules is a resonant process that shows no (or low) parasitic fluorescence emission. This intense and undisturbed 6T signal and negligible fluorescence are good characteristics to possibly develop Raman nanoprobes.