Chromophore ordering by confinement into carbon nanotubes

Y. Almadori [1,2], L. Alvarez[*1,2], R. Le Parc[1,2], R. Aznar[1,2], F. Fossard[3], A. Loiseau[3], B. Jousselme[4], S. Campidelli[4] , P. Hermet[5], A. Belhboub[1,2,6], A. Rahmani[6] T. Saito[7], and J-L Bantignies[1,2]

[1] Laboratoire Charles Coulomb UMR 5521, Université Montpellier 2, F-34095 Montpellier, France

[2] Laboratoire Charles Coulomb UMR 5521, CNRS, F-34095 Montpellier, France

[3] Laboratoire d'étude des microstructures, CNRS-ONERA, 92322 Châtillon, France

[4] CEA-Saclay, IRAMIS, NIMBE, Laboratoire d'Innovation en Chimie des Surfaces et Nanosciences (LICSEN), 91191 Gif-sur-Yvette Cedex, France

[5] Institut Charles Gerhardt Montpellier, UMR 5253 CNRS-UM2-ENSCM-UM1, Université Montpellier 2, Place E. Bataillon, 34095 Montpellier, France

[6] Laboratoire de Physique des matériaux et Modélisation des Systèmes, Université Moulay Ismaïl, Faculté des sciences (Unité associée au CNRST-URAC08), Boîte Postale 11201, Zitoune, 50000 Meknès, Morocco

[7] Nanotube Research Center, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba 305-8565, Japan

Supporting information :

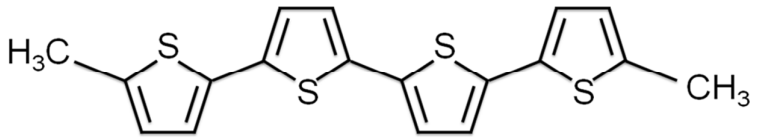

Figure 1: Structure of the 5,5"'-Dimethyl-2,2':5',2":5",2"'-quaterthiophene ($C_{18}H_{14}S_4$) called for simplicity dimethyl-quaterthiophene (4T) in the text.

* Corresponding author: Laurent.Alvarez@univ-montp2.fr, Phone: +0 33 467 143 541, Fax: 0 33 467 144 637

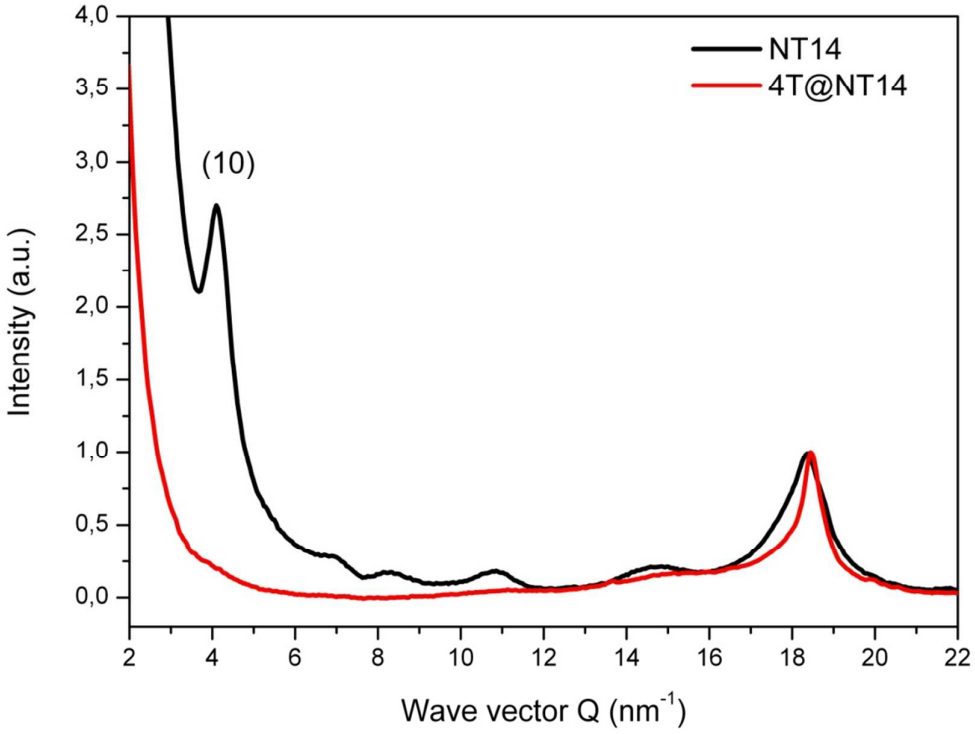

Figure 2: X-ray diffraction pattern recorded with a X-ray wavelength of 1.542 Å of empty NT14 and filled with 4T (4T@NT14). The 10 peak vanishes after encapsulation due to interference effects (N. BENDIAB *et al.* PHYSICAL REVIEW B 69, 195415, 2004), evidencing the encapsulation efficiency.

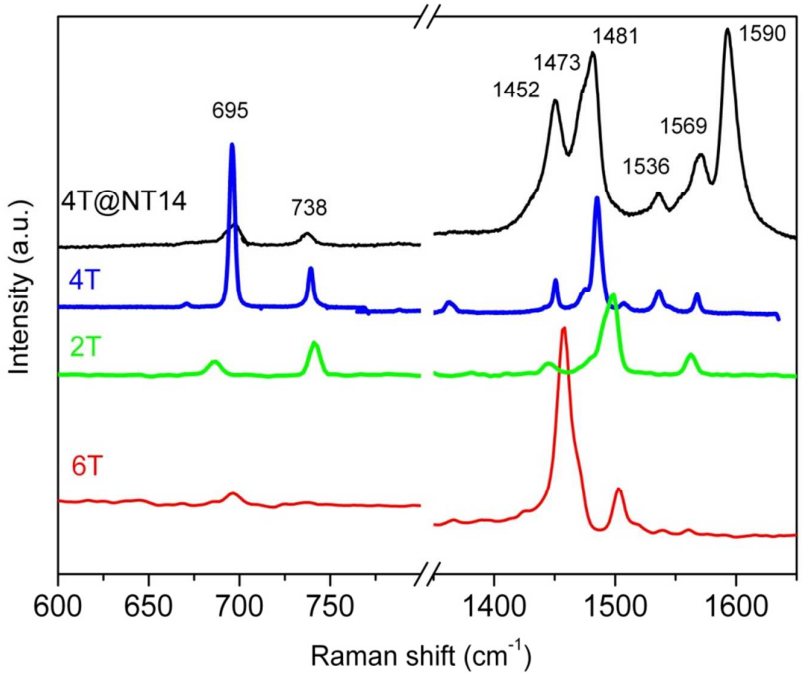

Figure 3: Raman spectra of dimethy-bithiophene (2T), dimethyl quaterthiophene (4T), sexithiophene (6T) and 4T confined into nanotubes (4T@NT14).
The Raman signal after encapsulation clearly correspond to the 4T response, meaning that the molecules were not modified by the encapsulation process.