

Abstract Submitted  
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**Diameter and Chiral Selective Purification of SWNT and DWNT Using CO<sub>2</sub>** PHILIPPE GAGNON, MAXIME BIRON, MAXIME DESJARDINS-CARRIERE, Ecole Polytechnique de Montreal, EMMANUEL FLAHAUT, Université Paul Sabatier, PATRICK DESJARDINS, Ecole Polytechnique de Montreal, RICHARD MARTEL, Université de Montreal — Oxidation of carbon nanotubes in air is a well known method to eliminate carbonaceous impurities from raw material. Recently, it has also been used to selectively remove single-wall carbon nanotubes (SWNT) present in double-walled carbon nanotubes (DWNT) soot[1]. Here, we propose a more efficient purification process for both SWNT and DWNT based on a high temperature oxidation in a pure CO<sub>2</sub> gas flow. This treatment, combined with a standard reflux in nitric acid, provides fast oxidation of amorphous carbon and removal of other impurities without affecting the structure of the carbon nanotubes. Parameterization of the treatment allowed us to observe both diameter and chirality dependence of the nanotubes reaction rate with CO<sub>2</sub>. This selective character was applied to produce thin films of clean and highly enriched DWNT and of semi-conducting SWNT. Microscopy and spectroscopy analyses will be shown and reveal that those films are composed of very high quality carbon nanotubes (micrometers long, very low impurity and catalyst concentration, low Raman  $I_D/I_G$  ratios). Also, no significant nanotube shortening is observed following the different diameter or chirality enrichment treatments.

[1] K. Iakoubovskii et al., J. Phys. Chem. C, 112, 30 (2008)

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