

ON THE ROUTE TO COMPATIBILIZATION OF CARBON NANOTUBES

Einat Nativ-Roth¹, Yael Levi-Kalisman², Oren Regev^{1,2}
and Rachel Yerushalmi-Rozen^{1,2} *

¹*Department of Chemical Engineering*

²*The Ilse Katz Center for Meso and Nano-scale Science and
Technology, Ben Gurion University of the Negev,
84105 Beer Sheva, Israel.*

ABSTRACT

The behavior of single wall and multi wall carbon nanotubes in aqueous solutions of Gum Arabic, a natural polysaccharide, is described. Using electron microscopy, we observe that while the as-prepared nanotube powders contain highly entangled ropes and bundles, the dispersions are mainly composed of individual tubes. TGA of the dried dispersions indicates that the stability of the tubes is not affected by the procedure. It is suggested that the ability of Gum Arabic to exfoliate the bundles, and stabilize individual tubes in aqueous dispersions, can be utilized in the preparation of carbon nanotube-polymer composites. Here the dispersing polymer can act as a compatibilizer and as an adhesion promoter leading to strengthening of the matrix-nanotube interface.

INTRODUCTION

Carbon nanotubes (CNT) are molecular threads with a typical diameter of a few nanometers and a length of up to tens of microns. The tubes form when 2-D hexagonal arrays of sp^2 bonded carbon atoms, known as graphene layers, roll into cylinders [1]. A single graphene layer forms a single wall nanotube (SWNT), while packing of several layers into concentric cylinders

* To whom correspondence should be addressed.
e-mail: rachely@bgumail.bgu.ac.il