



Electrical conductivity study across the Carbon nanotube (CNT)-gold Schottky junction

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Abstract

In this work the electrical conduction across the CNT bundle gold Schottky junction under the influence of external electric field using a conductive atomic force microscope (c-AFM). The CNT bundles were fabricated by a solution process technique on a SiO₂/Si substrate and the gold layer was deposited by thermal evaporation. The current-voltage measurement was done by using a c-AFM. The electrical contact on the CNT bundle was made by using a c-AFM tip. The I-V curves showed a non-linear characteristic like a junction diode as in the figure below. The current reduced significantly when a +10 V voltage is applied to the gate. There were no correlations found between the bundle diameter and the variation in current with and without gate bias. The phenomena observed in this work can be explained by the presence of metallic tubes in the bundle. The presence of metallic tube decreases the ratio of currents under the influence of 0 V and +10 V gate bias. this shows that the gating and conduction in the CNT bundle – metal Schottky junction strongly influenced by the composition of the CNT bundle,

Keyword: Carbon nanotube; CNT bundle; Schottky junction; c-AFM

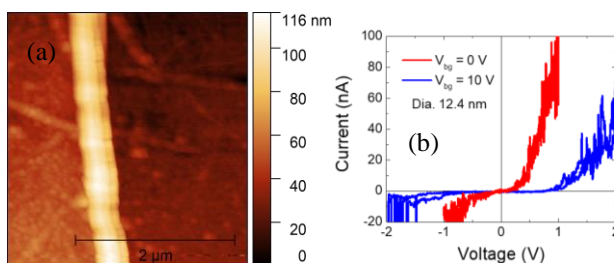


Figure: (a) AFM image of a CNT bundle network – gold interface and (b) the I-V curves across CNT-gold junction