Abstract Submitted
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Temperature-dependant current saturation in double-wall carbon nanotubes[1] DELPHINE BOUILLY, Department of physics, Universite de Montreal, Canada, MATTHIEU PAILLET, RICHARD MARTEL, Department of chemistry, Universite de Montreal, Canada, REGROUPEMENT QUEBECOIS SUR LES MATERIAUX DE POINTE (RQMP) COLLABORATION — Current saturation is known to occur at high voltage bias in carbon nanotubes, for single-wall as well as multi-wall configurations. This saturation is generally attributed to the backscattering of carriers by optical phonons. Here we report transport measurements performed on single double-walled carbon nanotubes as a function of temperature between 77K and 400K. The good quality of the contacts between the nanotubes and the electrodes allows to observe a temperature dependence in the I-V curves. At high temperature, the saturation current shows a value around 25μA, as expected from the energy of optical phonons, but then increases non-linearly with decreasing temperature. The low-bias conductance is also measured to increase with decreasing temperature. Phenomenological models are investigated in order to explain the observed trends.

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