ANOMALOUS THERMAL CONDUCTIVITY IN MULTIWALLED CARBON NANOTUBES WITH IMPURITIES

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The thermal conductivity of nanometer materials plays an important role in controlling the performance and stability of nano/micro devices. The synthesized multiwalled carbon nanotubes (CNT) (to be considered as the perspective elements for those devices) contain in sufficient manner the impurities of metallic catalysts, amorphous carbon and defects (like vacancy, pair of vacancies, adatoms) which significantly influence on peculiarities of electronic and heat transports [1]. In case of bulk disordered CNTs the basic contribution into thermal conductance in the temperature interval near the room temperature is determined by its phonon subsystem (see, for instance [2]). At the same time for a low-temperature region (< 50K) the crucial role both for thermopower and for thermal conductivity belongs to their electronic subsystem [3]. We study the process of heat transport and evaluate the thermal conductivity $k(T)$ in dependence on temperature for the multiwalled CNT with impurities on a base of Green's functions method, by means of the quantum kinetic Keldysh equation for 3*D* system and approximation of the transport relaxation time τ, which, in turn, corresponds to an appearance of local order like to amorphous metals.

References

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