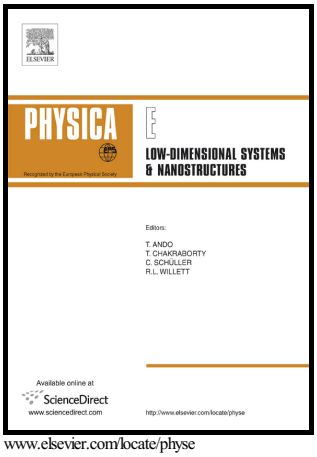

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Electronic Thermal Conductivity of Armchair Graphene Nanoribbons and Zigzag Carbon Nanotubes

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Abstract

Through the Green's function formalism and tight-binding Hamiltonian model calculations, the temperature dependent electronic thermal conductivity (TC) for different diameters of zigzag carbon nanotubes and their corresponding unzipped armchair graphene nanoribbons is calculated. All functional temperature dependencies bear crossovers, for which, at higher temperatures, nanotubes have a slightly higher TC than their derived nanoribbons, while below that crossover, both systems exhibit a significant coincidence over a moderate range of lower temperatures. Noticeably, TC decreases with increasing the width or diameter of the corresponding systems. Also, at low temperatures TC is proportional to the density of states around the Fermi level, and thus increasing for metal or semiconductors of narrower gap cases.

Keywords: Graphene nanoribbons; Carbon nanotubes; Thermal conductivity; Tight-binding; Green's function.

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