

عنوان مقاله:

Case study on length dependence of thermal conductivity of GNRs

محل انتشار:

سومین کنفرانس بین المللی پژوهش های کاربردی در علوم و مهندسی (سال: 1397)

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خلاصه مقاله:

The relative contribution to heat conduction by different phonon branches is still an intriguing and open question in phonon transport of graphene nanoribbons. By incorporating the direction dependent phonon-boundary scattering into the linearized phonon Boltzmann transport equation, we find that because of lower Grüneisen parameter, The TA phonons have the major contribution to thermal conductivity of GNRs, and in the case of smooth edge and micron-length of GNRS, the relative contribution of TA branch to thermal conductivity is over 50%. The length and edge roughness of GNRs have distinct influences on the relative contribution of different polarization branches to thermal conductivity. The contribution of TA branch to thermal conductivity increases with increasing the length or decreasing the edge roughness of GNRs. On the contrary, the contribution of ZA branch to thermal conductivity increases with decreasing the length or increasing the edge roughness of GNRs. The contribution of LA branch is length and roughness insensitive.

کلمات کلیدی:

TA branches, length dependence, phonon scattering, phonon boundary

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