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Investigation of specific heat in the monolayer graphene

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Abstract

In this paper, we have investigated the specific heat of the monolayer graphene under the polaron effect. For this purpose, we have first considered an electron coupled to the longitudinal acoustic (LA) phonon on the surface of the graphene with Coulomb impurity. Then, we have obtained the ground state energy of the polaron by employing the variational method and unitary transformation. We have used non-extensive thermodynamics to calculate specific heat different substrates like SiC, HfO₂, h-BN, and SiO₂. The specific heat variation with Coulomb bound parameter, magnetic field, temperature, and charge is then studied for these different substances.

Keywords: graphene, specific heat, bound polaron, Tsallis entropy

For full article, refer to the Persian section