Vibration Frequencies Analysis of Nanoporous Graphene Membrane

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Abstract : In this study, we use the atomic-scale finite element method to investigate the vibrational behavior of the armchair- and zigzag-structured nanoporous graphene layers with different size under the SFSF and CFFF boundary conditions. The fundamental frequencies computed for the graphene layers without pore are compared with the results of previous studies. We observe very good correspondence of our results with that of the other studies in all the considered cases. For the armchair- and zigzag-structured nanoporous graphene layers under the SFSF and CFFF boundary conditions, the frequencies decrease as the size of the nanopore increase. When the positions of the pore are symmetric with respect to the center of the graphene, the frequency of the zigzag pore graphene is higher than that of the armchair one.

Keywords : atomic-scale finite element method, graphene, nanoporous, natural frequency
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