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Simulation of a sound waveguide by two-dimensional phononic crystal with a hexagonal lattice

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Abstract

In this Paper, at first a band structure of a two-dimensional phonon crystal with square lattice including polymetheyl methacrylate cylinders, in air matrix, waz considered. By accounting for the band gap range of this structure, a sound waveguide was simulated. The expected result was observed. Then, another structure with a hexagonal lattice, including aluminum cylinders in tungsten matrix material was studied. By utilizing a finite element, computational method and COMSOL software and Matlab bandwidth structure was calculated. Also, the effect of symmetry on the width of the gap was investigated. By detecting the band gap, the simulation of an audio waveguide in the frequency range of 0.59 and 0.61 kHz was performed.

Keywords: Phononic crystal, Simulation, Sound waveguide, Band transmission, Band gap.

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