

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

H. Salehi*, A. Gholampour, S.F. Shojaienezhad

Department of physics, Faculty of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran

Abstract

In this Paper, at first a band structure of a two-dimensional phonon crystal with square lattice including polymethyl methacrylate cylinders, in air matrix, was 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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* Corresponding author E-mail: salehi_h@scu.ac.ir