Analysis of Scattering Behavior in the Cavity of Phononic Crystals with Archimedean Tilings

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Abstract : The defect mode of two-dimensional phononic crystals with Archimedean tilings was explored in the present study. Finite element method and supercell method were used to obtain dispersion relation of phononic crystals. The simulations of the acoustic wave propagation within phononic crystals are demonstrated. Around the cavity which is created by removing several cylinders in the perfect Archimedean tilings, whispering-gallery mode (WGM) can be observed. The effects of the cavity geometry on the WGM modes are investigated. The WGM modes with high Q-factor and high cavity pressure can be obtained by phononic crystals with Archimedean tilings.

Keywords : defect mode, Archimedean tilings, phononic crystals, whispering-gallery modes