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(Research Article)
Experimental comparison of sound transmission loss in pure aluminum and aluminum composite foams with 3wt% carbon nanotube and graphene nanoplate

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Abstract

In recent years, the importance of noise control has dramatically increased due to noise pollution. In this study, in order to improve the acoustic performance of pure aluminum foam, 3wt% carbon nanotube (CNT) and 3wt% graphene nanoplate (GNP) were added to the pure aluminum foam, foams were made with 60% porosity by 500 microns in diameter size. Then the transmission loss in Al-3wt%CNT and Al-3wt%GNP foams were compared to that of pure aluminum foam. The paper is focused on the sound transmission loss (STL) of the pure aluminum, Al-3wt%CNT and Al-3wt%GNP foams. The results showed that the addition of 3wt%CNT and 3wt%GNP respectively had about 20 and 7 dB in sound transmission loss in comparison to the pure aluminum foam. A better performance of nanotubes in comparison to nanoplates is due to the occurrence of Thermoacoustic phenomenon in the nanotubes and as a result of conversion of acoustic energy into heat energy.

Keywords: Sound transmission loss, Composite aluminum-carbon nanotube foam, Composite aluminum-graphene nanoplate foam, Thermoacoustic phenomenon.

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