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Mesophase pitch based carbon foams as sound absorbers

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ABSTRACT

Different from earlier researches, we study low frequency acoustic characteristics of mesophase pitch based carbon foams by impedance tube, and prove that carbon foams has low frequency absorption characteristics besides the application of thermal insulation and foreign matter adsorption. Three different samples are made of three asphalt raw materials: PNJ, PTZ and PDD. By carbonation and graphitization of the asphalt foam, different samples are prepared and corresponding sound absorption experiments display the porosity, density and micropore size of samples have a strong relationship with sound absorption capacity; increasing thickness of samples could heighten low frequency sound absorption coefficient, but increasement of back cavity would has almost no effects on low frequency. Combined with SEM images, the large porous microstructure with layered distribution is beneficial to absorption coefficient improvement of porosity material. This research shows carbon foams to be as the porous lightweight materials has a potential application in acoustics field, mechanism analysis in this research provides guidelines for design of sound absorption material having a microstructure porosity properties.

Keywords: Mesophase pitch, Carbon foams, Sound absorption

1. Introduction

Carbon foams have attracted increasing attentions in many industrial fields [1], owing to theirs high thermal stability, light weight, low thermal expansion, high thermal shock resistance and so on. Acoustic properties of carbon foams have been poorly investigated so far, and very few papers have been dedicated to such materials, whether they are graphitic or vitreous. Lacoste [2] studied the sound absorption and

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