

Multiwall carbon nanotube and graphene fillers for improving acoustic damping properties of flexible polyurethane foams

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Sound absorption coefficient, air flow resistivity, and cell size of the polyurethane foam/multiwall carbon nanotube composites and PUF/graphene composites were investigated with the additive content. The results show that the sound absorption coefficient and air flow resistivity are closely related, and that the increase of flow resistivity improves the sound absorption coefficient of the composites. For the PUF/MWCNT (0.2 phr) composite, the values of sound absorption coefficient and air flow resistivity were the highest values among the investigated MWCNT content, respectively. This is maybe due to that the PUF/MWCNT (0.2 phr) composite showed the smallest cell size among the MWCNT compositions. The increase in sound absorption coefficient and flow resistivity of the PUF/MWCNT (0.2 phr) composites is because of increasing the tortuous paths by the small cell size. It is suggested that the MWCNT or graphene which can act as a nucleating agent caused decreasing the cell size and increasing the tortuous paths of the foams, and this small cell size consequently increased acoustic damping properties of the PUF/MWCNT or PUF/graphene composites.