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Abstract

Lightweight carbon foam has been considered as one of the most promising candidates for providing excellent EMI shielding performance in the fields of aerospace and portable electronics. Here, multifunctional lightweight carbon composite foams were developed by the impregnation of phenolic resin and cenospheres (0-40 wt. %) into polyurethane (PU) foam substrate. Subsequent impregnated foams were converted into carbon-cenosphere composite foams via heat treatment at 1000ºC. The influence of cenosphere particles on the morphological, physical, mechanical electrical and thermal properties of carbon-cenosphere composite foams were studied in details. EMI shieling of carbon-cenosphere composite foam was measured in X-band frequency region (8.2-12.4 GHz) using waveguide method. The total shielding effectiveness (SE) of carbon foam was increased from -25.2 to -48.6 dB by the loading of 30 wt. % cenosphere. The thermal conductivity achieve as low as 0.02 W/(m.K), which is similar to aerogel.

Keywords: Carbon foam, cenosphere, composite, low density, electrical and thermal conductivity and EMI shielding.

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