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Preparation and characterization of open-cell epoxy foams modified with carbon fibers and aluminum powder

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ABSTRACT

Epoxy foams were prepared by the sacrificial template method. The porous template was prepared from carbamide granules and then impregnated with epoxy resin. The method ensured foams with low relative density of 0.334-0.358 and an open-cell structure consisting of regular spherical cells and round interconnecting windows. Epoxy resin was modified with short carbon fibers and aluminum powder. Both fillers ensured the increase in compressive strength by 12-15% as compared to the neat epoxy foam. The carbon fiber filler ensured much higher specific strength (up to 18.5-18.6 MPa·cm³·g⁻¹) due to little effect on the foam density. Sandwich composite samples were prepared using CPRF facing and the epoxy foam core, and promising mechanical properties of the sandwiches were stated by the 3-point midspan flexure test.

Keywords: Foam; Epoxy matrix; Compressive strength; Sandwich core

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