

Thermal conductivity of carbon/basal fiber reinforced epoxy hybrid composites

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Abstrak

The purpose of this paper is to analyse the thermal conductivity of carbon/basalt fiber reinforced hybrid composite structures based on stacking sequences. The paper also investigates the thermal impedance of carbon fiber reinforced polymer (CFRP) and basalt fiber reinforced polymer (BFRP) with increased thickness. Research involved processing hybrid composite by using injection moulding. The weight ratios of fibers to polymers was 60%: 40%. Testing was conducted using the ASTM D 5470 standard test method. Results show that the stacking sequences of carbon/basalt fibers have a significant impact on thermal conductivity. Hybrid composite with the stacking sequence mode C3B4C3 has the lowest thermal conductivity at 0.187 W/mK, and the highest thermal impedance of 0.0052 m²K/W. The highest thermal impedance of BFRP is at 0.007 m²K/W with 2.5 mm thickness. In CFRP, the highest thermal impedance is achieved by 3.4 mm thickness with 0.005 m²K/W. Results therefore show that carbon/basalt/epoxy hybrid composites are good insulators, since thermal conductivity is less than 0.42 W/moK standard.