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Cost Effective Thermoelectric Composites From Recycled Carbon Fibre: From Waste to Energy

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Abstract

Within the framework of recycling and reusing carbon fibre, this study focused on the fabrication of a thermoelectric composite encompassing recycled carbon fibre and two thermoelectric fillers (i) bismuth telluride and (ii) bismuth sulphide. This study investigated the effect of the concentration of bismuth telluride and bismuth sulphide fillers respectively on the thermoelectric, morphology, structural and thermal stability of the recycled carbon fibre thermoelectric composites. The optimum thermoelectric filler concentration is 45 wt% for both fillers, which resulted in a power factor of $0.194 \pm 9.70 \times 10^{-3} \mu\text{WK}^{-2}\text{m}^{-1}$ and $0.0941 \pm 4.71 \times 10^{-3} \mu\text{WK}^{-2}\text{m}^{-1}$ for recycled carbon fibre-bismuth telluride and recycled carbon fibre-bismuth sulphide composites respectively. This study exhibited the energy harvesting

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