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Synthesis and characterization of hierarchical structures based on CNT coated basalt fiber reinforced epoxy composites GARIMA MITTAL, KYONG YOP RHEE, Department of Mechanical Engineering, Kyung Hee University, South Korea — Hierarchical structures open a new gateway of the opportunities to design the composites with advanced properties. Further, CNT is considered as an ideal reinforcing material due to its extremely high aspect ratio and extraordinary mechanical, thermal, and electrical properties. On contrary, the tendency of forming bundles restricts to attain optimum benefits of CNTs as a reinforcing material. In that case, making hierarchical structure by coating CNTs on the substrate provide a good solution. Therefore, in this study, CNTs were grown directly in basalt fiber through chemical vapor deposition process. The formed structures were characterized using HR-RAMAN, XRD, and FE-SEM. Later, to fabricate the composites, these hierarchical structures were reinforced into epoxy matrix using hand lay-up method. Further, thermal and tribological properties of these hierarchical composites were analyzed using thermogravimetric analysis and friction and wear tests. The outcomes indicated that the hierarchical composites exhibit superior properties as compared to the directly reinforced CNT based basalt-epoxy composites.

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