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Temperature sensitive mechanical properties of Graphene-epoxy nanocomposites¹ ARDAVAN ZANDIATASHBAR, CATALIN PICU, NIKHIL KORATKAR, Rensselaer Polytechnic Institute — Carbon-based polymeric nanocomposites have potential applications including structural parts in aerospace vehicles and civil infrastructure. In this work various aspects of mechanical properties of Graphene-epoxy nanocomposites are studied at different scales. The quasi-static tensile yield stress and stiffness of the nanocomposite are larger than those of neat epoxy. While the creep response of the nanocomposite is similar to that of neat epoxy at lower stress and room temperature, a significant discrepancy is observed at high temperature and/or large stress, the nanocomposite creeping less. The fracture toughness for the nanocomposite with the optimum filler fraction is larger than the toughness of unfilled epoxy at room temperature. This difference decreases at higher temperatures. Local mechanical properties were investigated using nanoindentation and similar trends are observed.

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