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Multi-Scale Modeling of Carbon Nanotube/Carbon Fiber/Epoxy Lamina S.J.V. FRANKLAND, National Institute of Aerospace, J.C. RIDDICK, Army Research Laboratory, T.S. GATES, NASA Langley Research Center — A carbon fiber/epoxy lamina in which the carbon fibers are coated with single-walled carbon nanotubes is modeled with a multi-scale method. The multi-scale model is designed to predict the effect of the carbon nanotubes on the constitutive properties of the lamina. Within the model both the nanotube volume fraction and nanotube distribution are varied. The multi-scale analysis links results from molecular dynamics and equivalent-continuum techniques with micromechanics and strength of materials models. The multi-scale method will be used in a parametric study to examine the relative effect of nanotube concentration, orientation, and distribution on the constitutive properties of the lamina.

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