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Evaluating the Thermal Damage Resistance of Reduced Graphene Oxide/Carbon Nanotube Hybrid Coatings[1] LAMUEL DAVID, Kansas State University, ARI FELDMAN, ELISABETH MANSFIELD, JOHN LEHMAN, National Institute of Standards and Technology, GURPREET SINGH, Kansas State University, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY COLLABORATION — Carbon nanotubes and graphene are known to exhibit some exceptional thermal (K $\sim$ 2000 to 4400 W.m^{-1}K^{-1} at 300K) and optical properties. Here, we demonstrate preparation and testing of multiwalled carbon nanotubes and chemically modified graphene-composite spray coatings for use on thermal detectors for high-power lasers. The synthesized nanocomposite material was tested by preparing spray coatings on aluminum test coupons used as a representation of the thermal detector's surface. These coatings were then exposed to increasing laser powers and extended exposure times to quantify their damage threshold and optical absorbance. The graphene/carbon nanotube (prepared at varying mass% of graphene in CNTs) coatings demonstrated significantly higher damage threshold values at 2.5 kW laser power (10.6 μm wavelength) than carbon paint or MWCNTs alone. Electron microscopy and Raman spectroscopy of irradiated specimens showed that the composite coating endured high laser-power densities (up to 2 kW.cm^{-2}) without significant visual damage.

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