Evaluating the Thermal Damage Resistance of Reduced Graphene Oxide/Carbon Nanotube Hybrid Coatings\textsuperscript{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\textsuperscript{-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 $\mu$m 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.

\textsuperscript{1}This research is based on work supported by the National Science Foundation (Chemical, Bioengineering, Environmental, and Transport Systems Division), under grant no. 1335862 to G. Singh.

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Date submitted: 18 Nov 2013

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