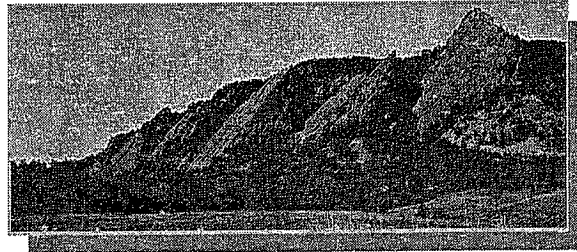
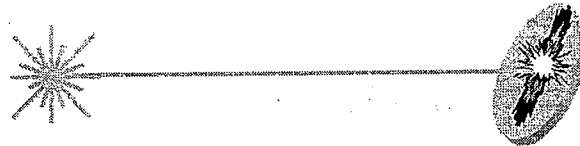


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Damage of thermal detector platforms based on metal-carbon nanotube composites

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ABSTRACT TEXT:

Today's standards for laser power and energy measurements are inadequate for tomorrow's high-power high-efficiency diode and fiber lasers. To meet this need, a new generation of thermal detector platforms based on carbon nanotubes (CNTs) and metal is being developed. Commercially available CNTs were selected based on the promise of high thermal conductivity and optical absorptivity reported in the literature. We discuss several techniques for the fabrication of thermal detector platforms including CNTs airbrushed on metal, aligned CNTs grown on copper, and a recently developed electroplating process. In the latter method CNTs were deposited with nickel on copper and then chemically etched to remove surface layers of nickel, thereby exposing the CNTs. We report qualitative evaluation of coating damage at laser irradiance at 10.6 μm up to 10 kW/cm² by scanning electron microscopy. In addition we present quantitative evaluation of optical properties and thermal conductivity.