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Optical Patterning of Three-Dimensional Carbon Nanotube Microstructures WEI-HUSUAN HUNG, RAJAY KUMAR, ADAM BUSHMAKER, MICHAEL J. BRONIKOWSKI, STEPHEN B. CRONIN — We present an optical, non-contact method for patterning three-dimensional carbon nanotube microstructures. In this method, a 1μm diameter focused laser spot is used to burn patterns in dense arrays of vertically grown multiwalled carbon nanotubes. The threshold for laser burnout and the depth of burnout are determined by Raman spectroscopy and scanning electron microscopy. Using a high precision translation stage to control the position of the laser spot on the sample, we create several 3D patterns to illustrate this method's potential use for the rapid prototyping of carbon nanotube microstructures [1]. After laser surface treatment, we observe undercut profiles, changes in nanotube density, and nanoparticle formation, which provide insight into the unique evolution of the nanotube microstructures during the burnout process. This non-lithographic method provides new opportunities for chemically sensitive applications of nanotubes and expands their possible applications into new areas.
[1] Hung, Wei Hsuan, Kumar, Rajay, Bushmaker, Adam, Cronin, Stephen B., and Bronikowski, Michael J. Rapid prototyping of three-dimensional microstructures from multiwalled carbon nanotubes. *Applied Physics Letters* **91**, 093121 (2007).

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