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Microwave Irradiation Induced Effects to Single-walled Carbon Nanotube Thin Films LU WANG, University of Arizona, YAO XIONG, Ohio University, ZIRAN WU, University of Arizona, LIWEI CHEN, Ohio University, HAO XIN, University of Arizona — Carbon nanotubes have been considered as potential building blocks for nano-scale circuits in virtue of their unique mechanical and electrical properties. However, one of the biggest obstacles for massive production of nanotube circuits is the difficulty of separating semiconducting tubes from metallic tubes or vice versa. In this work, a convenient method which may be potentially employed to selectively remove metallic tubes using microwave induced breakdown is proposed and investigated. Carbon nanotube thin films deposited on glass and quartz substrates are placed in a commercial microwave oven and heated for up to several minutes. The radial breathing mode in Raman spectra on the nanotube samples before and after the microwave irradiation suggests that the metallic-to-semiconducting ratios are reduced by around 20%. Meanwhile, because in the thin film samples most of the nanotubes are entangled, smaller diameter nanotubes (both metallic and semiconducting) tend to be affected more. THz transmission measurements of these thin films are also performed before and after microwave irradiation. The significant increase of transmission after the microwave irradiation process confirms the loss of metallic tubes.

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