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Raman spectroscopy of single-walled carbon nanotubes of different lengths exposed to microwave radiation P. BHATNAGAR, Angelo State Univ, S. FERGUSON, University of Texas - Dallas, G. SESTRIC, I. WRIGHT, S. WILLIAMS, Angelo State Univ — Carbon nanotubes have been observed to emit ultraviolet, visible, and infrared radiation when exposed to microwave fields. Although there is considerable controversy concerning the mechanism responsible for the emissions, the results of recently-performed experiments suggest that the emissions may be the result of field emission-induced luminescence. We have performed experiments in which both short (0.5 μm - 2 μm) and long (5 μm - 30 μm) single and double-walled carbon nanotubes were exposed to 2.46 GHz microwaves at a pressure of approximately 10^{-6} torr. A comparison of the spectra of the radiation emitted from the nanotubes suggests that the longer nanotubes emitted radiation of greater intensity than the shorter nanotubes, which is consistent with field emission-induced luminescence. Moreover, structural modification of the carbon nanotubes due to microwave irradiation has been studied using the Raman spectroscopy G-band and D-band intensities, which suggests that microwave irradiation at relatively low pressures results in a decrease in nanotube defects, especially in the case of the long nanotube samples.

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