Resonant Raman spectroscopy analysis of single wall carbon nanotubes treated with high density plasma of different gases.¹ DAVID MAST, CHAMINDA JAYASINGHE, ZHANDOS UTEGULOV², University of Cincinnati — Single wall carbon nanotubes (SWNTs) have been plasma treated with different gases (Ar, O₂ and Ar and H₂ gases mixtures) using an inductively coupled RF plasma system (IC-RFP). The gas pressure was varied from 50mtorr to 315mtorr at 50W plasma power. Microscopic plasma parameters including ion density (nᵢ) and electron temperature (Tₑ) (thermal energy of electrons) were been determined using a double Langmuir probe in the plasma. Treated SWNTs was been characterized using resonance Raman spectroscopy at 515nm and 633nm laser excitation. It was observed that there was a considerable increase of the D to G-band ratio of treated SWNTs with increasing gas pressures and also that the Breit-Wigner-Fano band (Gₚ) to G⁺-band ratio was been considerably increased. Further, at 515nm laser excitation the frequency up-shift of the G-band for Ar & (5%) H₂ (gas mixture) plasma treated SWNTs was higher at all pressures than those of other gases.

¹Thanks to Dr. John Maguire, AFRL/MLBP Wright-Patterson AFB for the use of the Raman Spectrometer.
²present address NIST, Boulder, CO.

David Mast
University of Cincinnati

Date submitted: 11 Jan 2006

Electronic form version 1.4