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Spectroscopic studies of particulate formation in fuel blends FELICIA MANCIU, Physics Department, MAHESH SUBRAMANYA, Combustion, Propulsion and Reaction Engineering Laboratory, Department of Mechanical and Industrial Engineering, JAYESH GOVANI, Physics Department, AHSAN CHOUDHURI, Combustion, Propulsion and Reaction Engineering Laboratory, Department of Mechanical and Industrial Engineering, University of Texas at El Paso — The Raman and infrared absorption spectroscopy were used to investigate the properties of carbon nanotubes (CNTs) flame-synthesized using CH_4-H_2 low calorific value gases. The development of large amounts of CNTs benefits from flame synthesis processes, where the fuel serves as both the heating and the reactant source. As a result of flame condition studies it was determined that the CNT growth region is at 20-30% of the visible flame height and at a flow rate between 7.18E-07 m^3/s and 9.57E-07 m^3/s. Preliminary characterizations of the samples by Scanning Electron Microscopy demonstrate that the formation of nanostructure occurs only for <10% H_2 concentration. The Raman analysis of the pristine samples shows the existence of distinctive multi-walled carbon nanotube (MWNT) D and G bands at 1321 cm^{-1} and 1595 cm^{-1}, respectively. Besides the vibrational lines characteristic to MWNTs, infrared absorption measurements also reveal the presence of C-H bonds.

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