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SPECTRAL STUDIES OF COMBINED UV-VIS AND INFRARED EMISSION FROM LASER-INDUCED CARBON AND OTHER PLASMAS

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Time-resolved infrared emission spectra were obtained at Hampton from YAG-laser induced graphite plasmas in various gaseous environments at atmospheric pressure in the wavelength range of 1-10μm using a single element LN_2 cooled InSb or HgCdTe detector and a scanning grating spectrometer. Spectra were averaged by a boxcar detector applying 10μs delays relative to the laser pulse and a 16μs gate width. These spectra were compared to laser-induced breakdown (LIB) carbon spectra in the UV-visible range obtained simultaneously as well as published earlier at the Central Research Institute for Chemistry, Budapest. The differences illustrate the specifics of infrared emission that are general for infrared LIBS (IR-LIBS) spectra. IR-LIBS spectra obtained for carbon are too complex and are of too low resolution to yield definite molecular assignments, but comparisons to low temperature solid phase IR absorption spectra, high temperature gas-phase IR emission spectra and a theoretical IR spectral database suggest assignments to certain class of carbon molecules. These results may be of interest for carbon nanostructure research. Some aspects of vibrational excitation in IRLIB spectra using plasma from a small PAH molecule will also be discussed.

Biography

Laszlo Nemes obtained a diploma in chemical engineering in 1959. I started doing research at the Pharmaceutical Research Institute, Budapest, then I joined the research network of the Hungarian Academy of Sciences and I have been associated ever since with that organization I am emeritus science adviser; possess a Ph.D. degree from the Technical University of Budapest a D.Sc. Degree from the Hungarian Academy of Sciences and Dr.Hab. as habilitated professor at the Technical University of Budapest. I was appointed Visiting Research Scientist at the Chemistry Department, University of Michigan, Ann Arbor, USA. of Pure and Applied Science at the St. Francis Xavier University in Nova Scotia, Canada. Since 1980 I was active in the field of laser induced chemistry and the emission spectroscopic studies of laser generated plasmas (mainly carbon plasmas). This activity brought me into close cooperation with the Space Institute of the University of Tennessee With colleagues there we have published a number of common papers in this field, mostly on diatomic molecules. Another of my special field has been the theory and spectroscopy of carbon clusters, especially fullerenes. In 2006 I retired but remained active at my former Institute, the Central Research Institute of Chemistry as science advisor emeritus. In the last 3 years I am associated with the Research Centre of Natural Sciences of the Hungarian Academy of Sciences, Budapest, as emeritus science advisor. A selected compilation of my scientific papers are available at Research Gate.

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