INFRARED SPECTROSCOPIC STUDIES AND LASER INDUCED FLUORESCENCE AND PHOSPHORESCENCE SPECTROSCOPY OF CARBON CLUSTERS IN SOLID ARGON.

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Small carbon clusters produced by evaporation of graphite were embedded in an argon matrix and investigated by Fourier transform spectrometers (Bruker IFS 113v and IFS 88) in the uv-visible and infrared spectral ranges. Time-resolved, laser induced fluorescence and phosphorescence spectra of such matrices were measured with a gated photodiode array spectrometer.
For identification of the produced molecules, the infrared absorption spectroscopy has been used. The observed phosphorescence and fluorescence emissions induced by a pulsed dye laser system are discussed and compared with the uv-visible absorption spectra of carbon clusters. The lifetimes of several excited states were obtained, and from the emission spectra, the corresponding vibration frequencies of the clusters in the ground state were estimated.