

FLUORESCENCE AND PHOSPHORESCENCE EXCITATION SPECTRA OF BENZENE AND TOLUENE
IN ARGON MATRICES

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The fluorescence and phosphorescence emission spectra of benzene and toluene isolated in rare gas matrices have been obtained by excitation in the vacuum U.V.. Whatever the photon energy is the lowest vibrationally relaxed triplet and singlet states are the only emitting states. Yet we observed that the ratio of the intensities of both emissions varied with the photon energy in the range 6 - 10 eV. As these preliminary results were obtained with few monochromatic resonance lamps, the present study was undertaken at LURE, Orsay, with synchrotron radiation from ACO as the tunable exciting light.

The excitation spectra have been recorded through a monochromator at several different peaks of both emissions for each compound. As long as the valence states of the aromatic molecule are excited both excitation spectra are rather similar; they are thought to reflect the absorption spectrum in the low temperature matrix (0.1% dilution). However when the energy is high enough for the Rydberg states to be reached the emission spectra become different so that no simple connection may be found out between them; they share no obvious relation with the -rather badly known- absorption spectra in this region.

The spectroscopic data will be presented and the modes of populating the emitting states will be discussed.