

MF09

15 min

4:11

INFRARED SPECTRUM OF CF₃H ADSORBED ON ALKALI HALIDE FILMS,
C. A. BAUMANN

The infrared spectrum of trifluoromethane adsorbed onto alkali halide films was observed. The C-H stretch (ν_1) is shifted 42 cm⁻¹ to the blue of the gas phase value, while the C-F stretch (ν_2) is only slightly shifted to the red. There are also noticeable splittings in the degenerate modes (ν_4, ν_5) that disappear in multilayer coverage.

The effects of substrate and temperature on the observed spectrum will be discussed. The observed vibrational shifts and desorption kinetics will be compared with those derived from the calculated potential of adsorption.

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MF10

10 min

4:28

LASER EXCITED FLUORESCENCE FROM ORGANIC DYES RELEASED FROM
LIPOSOMES,* P. MISRA, D.L. VANDERMEULEN, AND K.G. SPEARS

Liposomes are vesicles constituted of phospholipid bilayers dispersed in aqueous media. Owing to their structural similarities to membranes of biological cells, lipid vesicles serve as a model system to study the effects of laser radiation at the molecular level. We have been developing methods for preparing liposomes with dyes either encapsulated in the internal volume (e.g. sulforhodamine) or intercalated in the bilayer membrane (e.g. methylene blue). An important aim of these investigations has been to release efficiently the internal contents of the liposomes by pulsed laser excitation. Excitation by pulsed laser radiation at 532 nm was primarily within the nonfluorescent dimer band of sulforhodamine and resulted in localized heating. A single 8 ns wide pulse at 532 nm caused significant release of liposome contents, being dependent on liposome size, internal dye concentration, and pulse energy density. Methylene blue, which is a membrane-associating dye, was released even more efficiently than sulforhodamine. Time-correlated single photon counting measurements were made to gain insight into the distribution of dye molecules in the interior of the liposome and the bilayer. Potential applications of the technique of laser-mediated release of dyes from liposomes range from targeted release of drugs to localized photothermal release of photosensitizers accompanied by destruction of tumor tissue.

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