GAS-PHASE CH-OVERTONE BAND SPECTRA OF METHYL ACETATE AND ETHYL ACETATE VIA INCOHERENT BROAD-BAND CAVITY-ENHANCED ABSORPTION SPECTROSCOPY

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Gas-phase CH-stretching overtone bands of the two volatile organic compounds methyl acetate and ethyl acetate were detected for up to v = 6–0 by incoherent broad-band cavity-enhanced absorption spectroscopy. To obtain high sensitivity, short-pass and long-pass filters were used to cut background light out of a high reflection range of the dielectric multilayer mirrors consisting of the cavity. Hence, the signal-to-noise ratios of v = 4–0 were achieved to be 40–50 by the 100s integration time, suggesting an application possibility of this spectroscopic technique for environmental monitoring. Profiles of the observed overtone bands were analyzed in detail with the aid of theoretical calculations and their prominent peaks were assigned to the progressions starting from the bundles of the symmetric CH-stretching bands starting at 2964 cm^{-1}. Based on the local-mode analysis, the harmonic frequencies and the anharmonicities were determined and the dissociation energies were derived.