

DOPPLER-FREE TWO-PHOTON ABSORPTION SPECTROSCOPY OF VIBRONIC EXCITED STATES OF NAPHTHALENE ASSISTED BY AN OPTICAL FREQUENCY COMB

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We observe Doppler-free two-photon absorption spectra of three bands of $S_1 \leftarrow S_0$ transition of naphthalene. We use an optical frequency comb stabilized to a GPS clock as a frequency reference of a scanning cw laser. The use of the optical frequency comb enables us to decide transition frequencies of rovibronic lines and their linewidths with uncertainties of several tens of kHz^a. We discuss the interactions in vibronic excited states of naphthalene based on the dependences of frequency shifts and linewidths on vibrational and on rotational quantum numbers.

^aA. Nishiyama, K. Nakashima, A. Matsuba, M. Misono, J. Mol. Spectrosc. 318, 40 (2015).