PRECISION MEASUREMENT OF CARBON DIOXIDE HOTBAND TRANSITION AT 4.3 MICRON USING A HOT CELL

PEI-LING LUO, JYUN-YU TIAN, HSHAN-CHEN CHEN, *Institute of Photonics Technologies, National Tsing Hua University, Hsinchu, Taiwan 30013*; YU-HUNG LIEN, JOW-TSONG SHY, *Department of Physics, National Tsing Hua University, Hsinchu, Taiwan 30013.*

We report a mid-IR spectrometer based on a difference frequency generation (DFG). This tunable CW DFG source covers the spectral range from 2.6 μm to 4.7 μm with an output power of a few mW. The saturation spectrum of the $^{12}C^{16}O_2$ hot band $01^11 - 01^10$ P(30) transition is greatly enhanced by using a 40 cm long hot cell. The saturated absorption S/N ratio of over 1000 at 1 Hz bandwidth is achieved. We investigate the linewidth analysis and absolute frequency measurement of this transition. This transition center frequency of 69,267,228.761(15) MHz and the transition linewidth of 3.040(36) MHz are accurately measured.