

PRECISE FREQUENCY MEASUREMENTS OF THE $2\nu_3$ A₁ - ν_3 BAND TRANSITIONS OF METHANE WITH COMB-REFERENCED INFRARED-INFRARED DOUBLE-RESONANCE

HIROYUKI SASADA^a, *Department of Physics, Faculty of Science and Technology, Keio University, Yokohama, Japan*; SHO OKUBO, HAJIME INABA, *National Metrology Institute of Japan (NMIJ), National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan*; SHOKO OKUDA, *Department of Physics, Faculty of Science and Technology, Keio University, Yokohama, Japan*.

We have carried out infrared-infrared double-resonance spectroscopy of the $2\nu_3$ A₁ - ν_3 band of methane. The ν_3 band transitions are pumped using a 90.5 THz difference-frequency-generation (DFG) source frequency-controlled with an optical frequency comb (OFC), and ten tetrahedral components of the Q(1) to Q(4) transitions from the pumped levels are observed with a half-width at half maximum of 0.43 MHz using another 88.5 THz DFG source. The transition frequencies are determined with an uncertainty of 10 kHz using the OFC.

^aNational Metrology Institute of Japan (NMIJ)