

PURE ROTATIONAL SPECTRA OF ETHOXY RADICAL

CHING HUA CHANG, *Department of Applied Chemistry, Institute of Molecular Science, and Centre for Emergent Functional Matter Science, National Yang Ming Chiao Tung University, Hsinchu, Taiwan*; YASUKI ENDO, *Department of Applied Chemistry, National Yang Ming Chiao Tung University, Hsinchu, Taiwan*.

The ethoxy radical (C_2H_5O) is a reactive intermediate existing in many important combustion and atmospheric reactions. The near-UV electronic transitions of ethoxy radical were studied by Tan et al. in 1993, where the rotational and spin-rotation splittings were resolved.^a In the present study, the rotational spectra of C_2H_5O are measured by Fourier-transform Microwave (FTMW) and FTMW-microwave double-resonance spectroscopy in the frequency region of 4-40 GHz. The electric discharge of diluted ethanol is used to generate the ethoxy radical. Four a-type transitions and two b-type transitions including $K_a = 0$ and $K_a = 1$ are observed. The $2_{02}-1_{01}$ and $1_{10}-1_{01}$ transitions are reproduced with the double resonance technique. The rotational and spin-rotation coupling constants agree with Tan et al.'s results. However, the hyperfine splittings due to the five protons in the C_2H_5O radical are so complicated that definite assignment has not been obtained yet. We are trying to assign them with the help of the double resonance spectra.

^aX. Q. Tan, J. M. Williamson, S. C. Foster and T. A. Miller, *J. Phys. Chem.* 1993, 97, 9311-9316