ZERO KINETIC ENERGY PHOTOELECTRON SPECTROSCOPIC STUDIES OF THE GROUND ELECTRONIC STATES OF METHYL BROMIDE AND FURAN CATIONS

Y. J. SHI, S. WANG, Z. J. JAKUBEK, and B. SIMARD, *Steacie Institute for Molecular Sciences, National Research Council of Canada, 100 Sussex Drive, Ottawa, Ontario, K1A 0R6, Canada*; C-P. LIU, *Department of Chemistry, National Tsing Hua University, 101, Sec 2 Kuang-Fu Road, Hsinchu, Taiwan, 30043, R. O. C.*; H. Y. LI, *Enviroment Spectroscopy Laboratory, Anhui Institute of Optics and Fine Mechanics, The Chinese Academy of Sciences, P. R. China*.

High-resolution zero kinetic energy (ZEKE) photoelectron spectrum of methyl bromide has been obtained using vacuum ultraviolet laser single photon excitations. The dominant feature of the spectrum is the origin band of the transition $\tilde{X}\ ^2E_{3/2}$ - $X\ ^1A_1$. The excitation of the totally symmetric vibrational mode, ν_2 (CH_3 symmetruc deformation), is observed. The 3_1^1 hot band is also present. All the bands obtained show similar rotational contours. Simulation of the rotational contour of the origin band yields the accurate first ionization potential of methyl bromide (85022.4 $\pm$1.0 cm^{-1}) and also the rotational constants of the $\tilde{X}\ ^2E_{3/2}$ ground electronic state of the cation. The non-resonant two-photon ZEKE photoelectron spectrum of furan is also presented.