RYDBERG STATES OF XENON COLLISION DIMERS IN THE VUV ENERGY REGION

WAN-CHUN PAN, I-CHIA CHEN, *Department of Chemistry, National Tsing Hua University, Hsinchu 30013, Taiwan*; TZU-PING HUANG, and YIN-YU LEE, *National Synchrotron Radiation Research Center, Hsinchu 30076, Taiwan.*

The highly excited xenon dimers were prepared by colliding excited xenon atoms with ground-state xenon atoms. The excited xenon was produced by VUV light of synchrotron radiation for energy greater than 90000 cm^{-1} to form states in $nd[3/2]_1$, $ns[3/2]_1$, $nd[1/2]_1$, and $ns'[1/2]_1$, separately. Then the collision pairs, xenon dimers were ionized by an infrared light in the energy range of 11800-13400 cm^{-1}. This cw IR laser has a resolution of 0.2 cm^{-1}. Xenon ion produced from dissociative ionization was detected using a quadruple mass spectrometer in these experiments. The observed positions of spectral lines depend on the energy of the IR laser only, independent of the Rydberg states of xenon atoms. The line intensities significantly vary with the Rydberg states prepared of xenon atoms, indicating that the collision pairs Xe_2 were relaxed to some highly excited Rydberg states before ionization. Hence from the position of xenon dimer ion state B(1/2g) and energy restriction we assign the observed spectral lines corresponding to the Rydberg states of Xe_2 in the energy range of 84000-86000 cm^{-1}. Some tentative assignments will be reported.