LASER-INDUCED FLUORESCENCE OF RUBIDIUM DIMER: OBSERVATION OF TWO NEW VIBRONIC BAND SYSTEMS

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Rubidium dimers were formed by thermal vaporization of the metal followed by continuous co-expansion with helium or argon through a small pinhole into a vacuum chamber. The dimers were detected by laser-induced fluorescence. Vibrationally resolved excitation spectra were recorded for the D-X system near 430 nm and for new band systems in the wavelength regions of 386 nm - 401.5 nm and 347.2 nm - 358.4 nm. Long vibrational progressions were observed for all three band systems, indicative of substantial changes in the equilibrium bond lengths on electronic excitation. Isotope splittings between $^{85,85}Rb_2$ and $^{85,87}Rb_2$ were observable for one of the new band systems, facilitating the determination of the absolute vibrational numbering. Upper state vibrational constants were obtained, and the changes in the bond lengths were estimated from Franck-Condon modeling of the intensity distributions. A summary of the results and possible assignments of the excited electronic states will be presented.