INFRARED AND NEAR INFRARED EMISSION SPECTRA OF SbH AND SbD

SHANSHAN YU, D. FU, A. SHAYESTEH, DOMINIQUE R. T. APPADOO, AND P. F. BERNATH, *Department of Chemistry, University of Waterloo, Waterloo, ON, N2L 3G1, Canada*; IOULI E. GORDON, *Department of Physics, University of Waterloo, Waterloo, ON, N2L 3G1, Canada*.

The $X\ ^3\Sigma^-$ ground state vibration-rotation spectrum of SbH and the near infrared spectra of the $b\ ^1\Sigma^+$ - $X\ ^3\Sigma^-$ transition of SbH and SbD have been measured at high resolution by Fourier transform spectroscopy. The SbH and SbD radicals were generated in a tube furnace with a D.C. discharge of a flowing mixture of argon, hydrogen (or deuterium) and antimony vapor. In the infrared region, the 1 - 0 and 2 - 1 bands of the three components (0^+, 1_e and 1_f) as well as the 0^+ component of the 3 - 2 band were observed for ^{121}SbH and ^{123}SbH. In the near infrared region, the 0 - 0, 1 - 1 and 2 - 2 bands of the $b\ ^1\Sigma^+$ - $X\ ^3\Sigma^-$ system of both SbH and SbD, and as well as the 3 - 3 band of SbD were observed. The antimony isotopic shift was not resolved for these electronic spectra. The present data set was combined with the available ground state data on SbD and $a\ ^1\Delta$ data for SbH and SbD from previous work, and a least-squares analysis was performed for each of the four isotopomers: ^{121}SbH, ^{123}SbH, ^{121}SbD and ^{123}SbD. Improved molecular constants were obtained for the observed vibrational levels of the $X\ ^3\Sigma^-$, $a\ ^1\Delta$ and $b\ ^1\Sigma^+$ of these four isotopomers.