HIGH RESOLUTION LASER SPECTROSCOPY OF TITANIUM MONOBROMIDE AND HAFNIUM MONOFLUORIDE.

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High resolution laser spectra of TiBr and HfF have been taken in the blue and green-yellow regions of the spectrum. The group IV monohalide molecules were produced by laser vaporization of their respective metal rods, followed by reaction with CH_3Br or SF_6 in a pulsed supersonic jet. The electronic transition in TiBr has been identified as $^4\Gamma$ - $^4\Phi$, consistent with that of TiCl and TiF; however, a second, higher energy transition (tentatively assigned as $^4\Phi$ - $^4\Phi$) has also been observed, overlapping the first. We have managed to assign a number of the subbands and we will provide a case (a) analysis of the $^4\Gamma$ - $^4\Phi$ transition. Results for the second electronic transition will also be discussed. The transition in HfF is not, as of yet, determined. There are two transitions lying close to each other at 17528 cm^{-1} and 17432 cm^{-1}. The most intense subband (at 17,528 cm^{-1}) shows a strong Q-branch, medium strength R-branch and weak P-branch, indicative of a $\Delta\Lambda = +1$ type transition. This is in contrast with the $\Delta\Lambda = 0$, $^2\Delta_{3/2}$ - $^2\Delta_{3/2}$ transition recently observed for HfCl[a]. Work on this molecule is continuing and the results will be discussed.

[a]R. S. Ram, A. G. Adam, A. Tsouli, J. Lievin, and P. F. Bernath, J. Mol. Spectrosc. **202**, 116 (2000).