HIGH RESOLUTION LASER SPECTROSCOPY OF THE TITANIUM MONOHALIDES TiCl AND TiBr.

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High resolution laser spectra of TiCl and TiBr have been taken in the blue region of the spectrum. The titanum monohalide molecules were produced by laser vaporization of a Ti rod followed by reaction with either $CHCl_3$ or CH_3Br in a pulsed supersonic jet source. The TiCl molecule was recently studied by FT spectroscopy[a] where the electronic transition was identified as $^4\Gamma$ - $^4\Phi$ consistent with that of TiF. In the paper, band-by-band case (c) rotational analyses of the (0,0) $^4\Gamma_{5/2}$ - $^4\Phi_{3/2}$, $^4\Gamma_{7/2}$ - $^4\Phi_{5/2}$ and $^4\Gamma_{9/2}$ - $^4\Phi_{7/2}$ subbands were given. The authors observed no subbands which would provide the information crucial to determining the spin-orbit spacing. We have observed this same TiCl electronic transition with our apparatus and report here the observation of the (0,0) $^4\Gamma_{5/2}$ - $^4\Phi_{5/2}$ and $^4\Gamma_{7/2}$ - $^4\Phi_{7/2}$ subbands, in addition to those given above, and provide a case (a) molecular analysis. The same electronic transition for TiBr has also been recorded. Although the spectrum is much more congested than that of TiCl, we have managed to assign a number of the subbands and are also able to provide a case (a) analysis for this molecule.

[a] T. Imajo, D. Wang, K. Tanaka, and T. Tanaka, *J. Mol. Spectrosc.* **203**, 216 (2000).