# IMPROVEMENT OF SPECTROSCOPIC CONSTANTS FOR THE $A^3\Pi_{1u} \leftarrow X^1\Sigma_g^+$ SYSTEM OF $Br_2$

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High-resolution spectroscopy in the near infrared region is very important for frequency standards. We have measured the Doppler limited vibrational-rotational spectrum of ICl,[a] IBr,[b] $I_2$[c] and $Br_2$[d] by using a titanium sapphire laser, and have reported their spectroscopic constants. The present work presents revised spectroscopic constants for the $X$-state of $Br_2$ which are obtained by performing a combined-isotopologue least-squares fit to all available data for the three isotopic species. We are also attempting to observe the lowest vibrational levels of the $A$-state in order to allow us to determine the potential energy function of this state. Measurements were made at room temperature in the region $13000 - 13700\ \mathrm{cm}^{-1}$ and at 150-250°C in the region $11600 - 13000\ \mathrm{cm}^{-1}$. Details of these results will be presented.

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[c] N. Nishimiya, T. Yukiya, and M. Suzuki, J. Mol. Spectrosc. **182**, 271 (1997).
[d] T. Yukiya, N. Nishimiya, and M. Suzuki, Columbus Meeting, paper WH02 (2005).