THE $B(1/2^2P_{3/2}) \rightarrow X(1/2^2\Sigma^+)$ TRANSITION IN XeBr

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The $B(1/2\ ^2P_{3/2}) \rightarrow X(1/2\ ^2\Sigma^+)$ transition in XeBr was recorded in high resolution, using a CCD array detector to record spectra from Tesla discharge sources containing isotopically pure ^{136}Xe with $^{81}Br_2$ or $^{79}Br_2$[a,b]. The high signal/noise capabilities of the detector permitted the measurement of discrete vibrational structure in this system, which has normally been treated as a purely bound-free transition. The assignments comprised 119 v'-v'' bands for $^{136}Xe^{81}Br$ and 86 for $^{136}Xe^{79}Br$, spanning v'= 0-33 and v''= 0-16. The van der Waals ground state was analyzed through fits to the customary polynomials and to near- dissociation expansions. Franck-Condon calculations were used to locate the X-state potential on the internuclear axis relative to the B state, which was modeled as a Rittner potential. The following fundamental spectroscopic constants (units cm^{-1}, for $^{136}Xe^{81}Br$) were obtained from the analysis: $T_e' = 35\ 863.2$, $\omega_e' = 135.72$, $\omega_e x_e' = 0.32$, $\omega_e'' = 25.7$, $\omega_e x_e' = 0.62$. The ground state has a dissociation energy $D_e'' = 254 \pm 2$ cm^{-1}and supports 24 bound vibrational levels.

[a] Jason O. Clevenger and Joel Tellinghuisen *Chem. Phys. Lett.* **231**, 515 December 1994.
[b] Jason O. Clevenger and Joel Tellinghuisen *J. Chem. Phys.* **103**(22), 9611 December 1995.