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Laser-Excited Fluorescence Spectroscopy of Br_2: NIR Transitions to High Vibrational Levels in the $X(^1\Sigma_g^+)$ State DAVID DOLSON, DAVID POSTELL[1], Department of Chemistry, Wright State University, Dayton, OH 45435, GLEN PERRAM, Department of Engineering Physics, Air Force Institute of Technology, Wright-Patterson AFB, OH 45433 — The $B(^3\Pi_{0u}^+)$ – $X(^1\Sigma_g^+)$ laser-excited fluorescence spectrum of Br_2 was recorded with rotational resolution in the visible and near infrared (NIR) spectral regions to 1400 nm. The line-narrowed (0.2 cm^{-1}) output of a 532nm pulsed Nd:YAG laser was used to excite eight fluorescence progressions in a natural abundance sample. Six of the excitation transitions occur in the $^{79,81}Br_2$ isotopomer and one each in the $^{79}Br_2$ and $^{81}Br_2$ isotopomers. NIR fluorescence transitions from the $25 \leq v' \leq 33$ laser-excited levels to the $28 \leq v'' \leq 44$ vibrational levels in the ground state were observed between 950 nm and 1400 nm. The 97 lines from this NIR data set were combined with 6300 lines calculated with the data of Focsa et al [*J. Mol. Spectrosc.* **200**, 104-119 (2000)] to derive a set of Dunham coefficients for the ground state. An $X(^1\Sigma_g^+)$ state RKR potential curve also was constructed for vibrational levels, $v'' = 0 - 44$, which extends three quarters of the way to the dissociation limit.

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