HIGH-RESOLUTION THz MEASUREMENTS OF BrO GENERATED IN AN INDUCTIVELY COUPLED PLASMA

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Building upon the foundation provided by previous work, the $X_1{}^2\Pi_{3/2}$ and $X_2{}^2\Pi_{1/2}$ states of the transient radical, BrO, were interrogated in previously unprobed spectral regions (0.5 to 1.7 THz) by employing JPL developed high-resolution cascaded frequency multiplier sources. Like other members of the halogen monoxides (XO), this species has been the target of several recent atmospheric remote sensing studies and is a known participant in a catalytic ozone degradation cycle. For the current work, BrO is generated in an inductively coupled plasma under dynamic flow conditions and rotational lines are observed directly at their Doppler-limited resolution. New spectral transitions including those owing to both the ground (ν=0) and excited (ν=1 and 2) vibrational states of isotopologues composed of permutations of natural abundance ^{16}O, ^{18}O, ^{79}Br, and ^{81}Br are fit to a global Hamiltonian containing both fine and hyperfine terms. In addition to further refining existing spectroscopic parameters, new observations will be made available to remote detection communities through addition to the JPL catalog. New findings will be discussed along with future plans to extend these studies to other halogen monoxides (X=Cl and I) and the more massive halogen dioxides (OXO & XOO).