THE PURE ROTATIONAL SPECTRA OF VN \((X^3\Delta_r)\) and VO \((X^4\Sigma^-)\)

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The pure rotational spectra of VN \((X^3\Delta_r)\) and VO \((X^4\Sigma^-)\) in their ground electronic states have been recorded in the frequency range 295-525 GHz. In each case, seven rotational transitions were measured. Fine structure and vanadium hyperfine splittings were resolved in these data. These radicals were produced by reacting gas-phase \(\text{VCl}_4\) with \(\text{N}_2\) (VN) or residual \(\text{O}_2\) (VO) in an AC discharge. Rotational, fine, and hyperfine constants were determined. In particular, the hyperfine constants \(a, b,\) and \(c\) for VN have been established from a global fit to the spectra. The parameters obtained are in good agreement with previous studies.