LABORATORY DETECTION AND PURE ROTATIONAL SPECTRUM OF VCl^+ BY VELOCITY MODULATION SPECTROSCOPY

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The pure rotational spectrum of VCl^+ has been measured using millimeter-wave direct absorption techniques incorporating velocity modulation for ion selection. This work is the first laboratory observation of this species. VCl^+ was created in an AC glow discharge of gas-phase VCl_4 and argon. Rotational transitions of the ^{35}Cl and ^{37}Cl isotopomers have been measured originating in four fine structure components of this ion, each which exhibit hyperfine structure arising from the ^{51}V nuclear spin (I = 7/2). The current data suggest a $^4\Phi_r$ or $^4\Delta_r$ ground state. Additional spectroscopic measurements are in progress and the latest results will be presented.