PERTURBATIONS IN THE GROUND ELECTRONIC STATE ROTATIONAL SPECTRUM OF TRANSITION-METAL CONTAINING MOLECULES

D. T. HALFEN, *Department of Chemistry, Department of Astronomy, and Steward Observatory, University of Arizona, Tucson, AZ 85721*; R. W. FIELD, *Department of Chemistry, MIT, Cambridge, MA 02139*; and L. M. ZIURYS, *Department of Chemistry, Department of Astronomy, and Steward Observatory, University of Arizona, Tucson, AZ 85721*.

Transition-metal containing molecules, in general, have a high density of electronic states even in the energy region of the electronic ground state. Often the pure rotational spectrum of these species exhibits perturbations caused by low-lying excited states. Examples of these perturbations include irregular spin-orbit, fine structure, and hyperfine patterns. A good example of a molecule exhibiting some of these perturbations is VCl^+. This species has a $^4\Sigma^-$ ground state, but has unusually large spin-spin splittings. These perturbations indicate that the ground state is interacting with the excited $^4\Pi_i$ and/or $^2\Pi_i$ states. A deperturbation analysis of the rotational spectrum of VCl^+ is currently underway, and the results of this analysis will be presented.