HIGH RESOLUTION LASER SPECTROSCOPY OF RHODIUM MONOCHLORIDE.

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High resolution laser spectra of rhodium monochloride (RhCl) have been acquired in the green and blue regions of the visible spectrum. The molecules were produced via laser ablation of a rhodium target rod, followed by reaction with trichloromethane in a pulsed supersonic jet. Several electronic transitions have been observed and analysed between 19,700 and 23,100 cm^{-1}. Two distinct lower state omega values have been determined: $\Omega = 3$ which is consistent with the $^3\Delta_3$ ground state observed for RhH and RhD [a], and $\Omega = 2$ which curiously enough seems to be the ground state of RhF [b]. As of yet, which Ω value represents the ground state is unknown as transitions from either of these states seem equally intense. Dispersed fluorescence (DF) scans have been taken from a number of the observed excited states yielding an estimate of 350 ± 20 cm^{-1} for a lower state vibrational frequency. The DF scans are also quite complicated indicating the presence of a number of low-lying states with energies less than 3200 cm^{-1} above the ground state. Work on the RhCl molecule is continuing and results will be discussed.

[a] W.J.Balfour, J. Cao, and C.X.W. Qian, J. Mol. Spectrosc. 201, 244(2000)

[b] A.G. Adam, W.J. Balfour, R. Li, and S.A. Shepard, to be published