LASER INDUCED FLUORESCENCE SPECTROSCOPY OF RHODIUM FLUORIDE

ROMEY F. HEUFF, WALTER J. BALFOUR, RUNHUA LI and ROY H. JENSEN, *Department of Chemistry, University of Victoria, Victoria, British Columbia, Canada, V8W 3P6*; ALLAN G. ADAM and SCOTT A. SHEPARD, *Department of Chemistry, University of New Brunswick, Fredericton, New Brunswick, Canada E3B 6E2*.

Rhodium monofluoride has been observed and spectroscopically characterized for the first time. RhF molecules were produced under jet-cooled conditions in a laser vaporization molecular beam source by the reaction of a laser-vaporized rhodium plasma with SF_6 doped in helium, and studied with laser-induced fluorescence spectroscopy under both medium- and high-resolution. More than 25 LIF bands have been observed between 18 500 and 24 500 $\mathrm{cm}^{-1}$and five of these have been recorded at 200 MHz resolution. All bands of appreciable intensity have been rotationally analyzed. The ground electronic level has Ω = 2, which is attributed to an inverted $^3\Pi$ state from the $2\delta^4 12\sigma^1 6\pi^3$ electron configuration. The ground level rotational constants are B = 0.27245 cm^{-1}, D = 1.035x10^{-7} cm^{-1}. Very small ground level Λ - doublings are evident in the spectrum. Excited states having Ω = 1, 2 and 3 have been identified. Dispersed fluorescence spectroscopy from eleven excited levels has been used to locate a large number of low-lying vibronic states within the energy range up to 8000 cm^{-1}. A ground state vibrational interval of ~575 $\mathrm{cm}^{-1}$is suggested.