OBSERVATION AND CHARACTERIZATION OF THE PURE ROTATIONAL SPECTRA OF LuF AND LuCl

STEPHEN A. COOKE, CHRISTINE KRUMREY, and MICHAEL C. L. GERRY, *Department of Chemistry, The University of British Columbia, 2036 Main Mall, Vancouver, British Columbia, Canada, V6T 1Z1*.

The pure rotational spectra of two isotopomers of LuF and three isotopomers of LuCl have been observed for the electronic ground state $X^1\Sigma^+$ in both ground and excited vibrational states, within the 5.5 – 17 GHz spectral region. These are the first high-resolution spectra observed for these molecules. The measurements were performed using a cavity pulsed-jet Fourier transform microwave spectrometer. The molecular species were prepared by laser ablation of Lu metal in presence of SF_6 or Cl_2 in Ar as a carrier gas. The rotational constants and nuclear quadrupole coupling constants (which are very large for Lu), as well as the equilibrium internuclear distances, have been determined through analyses of the transition frequencies. A theoretical study has complemented the experimental results.