OPTICAL ZEEMAN SPECTROSCOPY OF YTTERBIUM MONOFLUORIDE; YbF[a]

TONGMEI MA, TIMOTHY C. STEIMLE, *Chemistry and Biochemistry, Arizona State University, Tempe, AZ USA 85287*; COLAN LINTON, *Physics Department, University of New Brunswick, Fredericton, NB Canada E3B 5A3*; JOHN BROWN and CLEONE BUTLER, *Physical and Theoretical Chemistry, Oxford, UK OX1 3QZ.*

The heavy polar molecular monofluoride, YbF, has been used to set an upper limit on the electric-dipole moment of the electorn, d_e[a] . These measurements are dependent upon precise knowledge of the magnetic field which can be readily ascertained from the analysis of the optical Zeeman spectrum. Here we report on the analysis of Zeeman effect on the $A^2\Pi_{1/2}$-$X^2\Sigma^+$(0,0) band of ytterbium monofluoride, ^{171}YbF, recorded at near-natural linewidth limit. A molecular beam was generated by skimming the output of a laser ablation/supersonic expansion. The Zeeman tuning of the $X^2\Sigma^+$(v=0) state could be modeled and the determined g-factors differ slightly from those derived from the matrix isolated ESR results.[b] The Zeeman tuning of the $A^2\Pi_{1/2}$ (v=0) state is unusually strong due to significant Born-Oppenheimer breakdown.

[a]Supported by NSF(TCS-ASU).

[a]J.J. Hudson, B.E. Sauer, M.R.Tarbutt, and E.A. Hinds, Phys. Rev. Lett., 89, 023003-4 (2002).

[b]R.J. Van Zee, M.L. Seely, T.C. DeVore and W. Weltner, Jr., J. Phys. Chem., 82, 1192 (1978)