ANALYSIS OF THE $A^4\Pi_r - X^4\Sigma^-$ ELECTRONIC TRANSITION OF MOLYBDENUM NITRIDE (MoN)

LEAH C O’BRIEN, Department of Chemistry, Southern Illinois University, Edwardsville, IL, USA; GABRIEL A HOTZ, KRISTIN N BALES, JACK C HARMS, JAMES J O’BRIEN, Chemistry and Biochemistry, University of Missouri, St. Louis, MO, USA; NYLA S WOODS, Department of Chemistry, Southern Illinois University, Edwardsville, IL, USA; WENLI ZOU, Institute of Modern Physics, Northwest University, Xi’an, China.

Transition metal nitrides are of growing interest due to their catalytic, energy storage, sensing, superconducting, and mechanical properties. The (0,0) band of the $A^4\Pi_r - X^4\Sigma^-$ transition of MoN was recorded at Doppler-limited resolution using intracavity laser spectroscopy (ILS) integrated with a Fourier-transform spectrometer used for detection (ILS-FTS). The target MoN molecules were produced in the plasma discharge of a molybdenum-lined copper hollow cathode, using a gas mixture of Ar with about 1% N$_2$ in a reaction chamber with about 1 Torr total pressure. Isotopologue structure in the spectrum is clearly visible and analysis is underway for the five abundant isotopologues with no nuclear spin ($I_{Mo}=0$): $^{92}$MoN (14.6%), $^{94}$MoN (9.2%), $^{96}$MoN (16.7%), $^{98}$MoN (24.3%), and $^{100}$MoN (9.7%). The progress, preliminary results of this analysis, and comparison to a recent high-level computational study will be provided.