LASER INDUCED FLUORESCENCE SPECTROSCOPY OF JET-COOLED MgOMg

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The group IIA metals have stable hypermetallic oxides of the general form MOM. Theoretical interest in these species is associated with the multi-reference character of the ground states. It is now established that the ground states can be formally assigned to the $\mathrm{M^+O^{2-}M^+}$ configuration, which leaves two electrons in orbitals that are primarily metal-centered ns orbitals. Hence the MOM species are diradicals with very small energy spacings between the lowest energy singlet and triplet states. Previously, we have characterized the lowest energy singlet transition ($^1\Sigma_u^+ \leftarrow ^1\ \Sigma_g^+$) of BeOBe. Preliminary data for the first electronic transition of the isovalent species, CaOCa, was presented previously (71^{st} ISMS, talk RI10).

We now report the first electronic spectrum of MgOMg. Jet-cooled laser induced fluorescence spectra were recorded for multiple bands that occurred within the 21,000 - 24,000 $\mathrm{cm^{-1}}$ range. Most of the bands exhibited simple P/R branch rotational line patterns that were blue-shaded. Only even rotational levels were observed, consistent with the expected X $^1\Sigma_g^+$ symmetry of the ground state ($^{24}\mathrm{Mg}$ has zero nuclear spin). Molecular constants were extracted from the rovibronic bands using PGOPHER. The experimental results and interpretation of the spectrum, which was guided by the predictions of electronic structure calculation, will be presented.