POPULATION DEPLETION SPECTROSCOPY OF STRONTIUM MONOMETHOXIDE

D. FORTHOMME , L. E. DOWNIE, A. D. GRANGER, A. G. ADAM, C. LINTON, D. TOKARYK, *Centre for Laser, Atomic and Molecular Sciences, Physics and Chemistry Departments, University of New Brunswick, Fredericton, NB, Canada, E3B 5A3*; W. S. HOPKINS , *Physical and Theoretical Chemistry Laboratory, Department of Chemistry, University of Oxford, Oxford, U.K. OX1 3QZ.*

High resolution laser induced fluorescence excitation spectra have been obtained of the origin bands of the $A\ ^2\mathrm{E} \leftarrow X\ ^2\mathrm{A}_1$ and $B\ ^2\mathrm{A}_1 \leftarrow X\ ^2\mathrm{A}_1$ transitions for two isotopologues, $\mathrm{SrO}^{12}\mathrm{CH}_3$ and $\mathrm{SrO}^{13}\mathrm{CH}_3$, of strontium monomethoxide. The molecules were produced by laser ablation of a strontium target rod followed by reaction with ^{12}C - or ^{13}C - substituted methanol seeded in helium, prior to expansion into vacuum to form a pulsed supersonic jet. The spectra were complex and more congested than those we previously reported for the isoelectronic calcium monomethoxide molecule. Rotational J assignments were established from common ground state combination differences. Definitive assignments of the K structure and of the F_1 F_2 spin rotation components of the $B\ ^2\mathrm{A}_1$ state were, however, much harder to establish and could only be achieved using optical optical double resonance (OODR) population depletion spectroscopy. We will report the latest results and analysis and also show how, by employing OODR, we were able to resolve and quantify the very small spin rotation splitting in the ground $X\ ^2\mathrm{A}_1$ state.