FOURIER TRANSFORM MICROWAVE SPECTROSCOPY OF ALKALI METAL ACETYLIDES

P. M. SHERIDAN, M. K. L. BINNS, *Canisius College, Buffalo, NY 14208*; J. MIN, M. P. BUCCHINO, D. T. HALFEN, and L. M. ZIURYS, *Department of Chemistry, Department of Astronomy, and Steward Observatory, University of Arizona, Tucson, AZ 85721*.

Fourier transform microwave spectroscopy has been used to record pure rotational transitions of lithium, sodium and potassium acetylides and their deuterium isotopologues in their ground electronic state. The metal acetylides were produced by discharge assisted laser ablation of solid lithium, sodium and potassium in the presence of acetylene and deuterated acetylene. Rotational transitions in the 5 - 40 GHz range were measured and hyperfine splittings due to the alkali metals and deuterium were resolved. Alkali metal quadrupole coupling constants were determined for each species and deuterium quadrupole coupling constants were determined for the deuterated species. An interpretation of the hyperfine parameters in terms of metal-ligand bonding character will be discussed.