HYPERFINE INTERACTIONS IN MAGNESIUM-BEARING FREE RADICALS

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The technique of laser ablation has greatly eased the production of diamagnetic and paramagnetic metal-containing molecules for spectroscopic study. High resolution measurements can be made of the hyperfine splitting in the pure rotational transitions of these types of molecules with a cavity Fourier transform microwave (FTMW) spectrometer. The precise constants derived from these measurements then provide a means of probing the electronic structure of the molecule or free radical under investigation.

As reported previously, we have constructed a laser ablation setup for our parallel configuration FTMW spectrometer[a] Recently, we have used this system to measure the microwave spectra, between 4 and 26.5 GHz, of several magnesium containing molecules. For one of these compounds, MgNC, the ^{14}N hyperfine splitting has been observed. Constants for both magnetic hyperfine and nuclear quadrupole hyperfine interactions have been derived from the observed transitions. These constants will be used to discuss the electronic structures of these molecules and comparisons will be made to other similar systems.

[a] K. A. Walker and M. C. L. Gerry, *J. Mol. Spectrosc.*, in press.