

## DIAGNOSTIC TESTS OF A COLLISIONAL COOLING CELL USED IN AN FTIR SPECTROMETER

C. D. BALL, F. C. DE LUCIA, *Department of Physics, The Ohio State University, 174 W. 18th Avenue, Columbus, OH 43210*; M. MENGEL, M. LOCK, B. P. WINNEWISSER, M. WINNEWISSER, *Physikalisch-Chemisches Institut, Justus-Liebig-Universität, D-35392 Gießen, Germany*.

A new, liquid helium cooled collisional cooling cell has been constructed for use in spectral simplification experiments. The cell was cooled in a Janis vaporization cryostat and spectra were measured using a Bruker high resolution Fourier transform infrared spectrometer. Diagnostic tests of this cell using C<sub>2</sub>H<sub>2</sub>, N<sub>2</sub>O, and CClF<sub>3</sub> injected into a helium buffer gas show that the cell can be a useful tool for future simplification experiments. The initial failures and later successes of these tests revealed important information on the required operational parameters. Near-infrared measurements of C<sub>2</sub>H<sub>2</sub> seemed to show only moderate cooling of the gas. However, in the overtone region, the S/N ratio was not adequate for useful diagnostics, and the spectrum was only observed for excessive injector flow rates. In the mid-infrared region, measurements of N<sub>2</sub>O yielded very acceptable rotational temperatures ( $T_{rot}=76$  K for  $T_{cell}=50$  K). Measurements of CClF<sub>3</sub> lines were taken to demonstrate the capabilities of collisional cooling with this system for spectral simplification.