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Characterization of a cryogenic buffer-gas beam using matrix isolation infrared spectroscopy CAMERON J. E. STRAATSMA, MAYA I. FABRIKANT, HEATHER J. LEWANDOWSKI, JILA, University of Colorado — Cryogenic buffer-gas beams have many advantages over traditional supersonic jet sources including the ability to produce intense beams of exotic molecular clusters and radicals. We report on the characterization of a cryogenic buffer-gas beam used as a source of cold molecules in a matrix isolation Fourier transform infrared spectroscopy experiment. Using laser ablation of a solid target inside a buffer-gas cell, carbon clusters are produced, cooled, and entrained in a cryogenic beam of neon gas. This beam is directed towards an IR transparent window where it freezes, effectively trapping the molecules in a solid, inert matrix from which vibrational modes in the range of 800 cm^{-1} to 4000 cm^{-1} can be investigated. In addition to the characterization of our apparatus with carbon clusters, we report on efforts to investigate transition metal oxide molecules (i.e. VO) as well as cold chemical reactions involving CH.

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