INFRARED SPECTRA OF C_2H_4 UNDER JET-COOLED AND PARA-H_2 MATRIX CONDITIONS

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Spectra of C_2H_4 isolated in para-H_2 are compared with those of jet-cooled C_2H_4 recorded with an FTIR spectrometer. The ν_7, ν_9, and ν_{11} bands of jet-cooled C_2H_4 all exhibit an intensity distribution corresponding to about 10 K for rotation, with no evidence of nuclear spin conversion. Spectra of the ν_{11} band of C_2H_4 isolated in solid para-H_2 clearly show a rotational structure similar to that observed for C_2H_4 in helium droplets. Other bands of C_2H_4 exhibit only partially resolved rotational structures. Rotational constants B and C for ν_{11} of C_2H_4 in para-H_2 are about 50 % those of the gaseous C_2H_4. The out-of-plane deformation mode ν_7 shows a small (< 1 cm^{-1}) blue matrix shift, whereas other modes are red-shifted by 2.2 to 3.9 cm^{-1}.

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