JET-COOLED ROTATIONAL SPECTRA OF LASER-VAPORIZED THIOUREA

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Solid organic compounds with relatively high melting points present very low vapor pressures, posing difficulties to the spectroscopical study in gas phase. For these species laser ablation can be an effective way of vaporizing neutral sample molecules, preventing the thermal decomposition of the heating methods. The jet-cooled rotational spectrum of thiourea has been observed for the first time in the frequency range 7-18 GHz using a laser-ablation molecular-beam Fourier transform spectrometer built-up in our laboratory. The rotational spectra of the ^{34}S-, ^{13}C-, and ^{15}N-thiourea isotopomers have been observed in natural abundance confirming the high sensitivity of the spectrometer. The spectrum of D_4-thiourea vaporized from an enriched sample has been also observed. The complicated hyperfine structure due to two ^{14}N quadrupolar nuclei has been resolved and analyzed. The structure of thiourea has been determined from the derived rotational parameters. The heavy atoms skeleton of thiourea is planar with hydrogen atoms slightly out of plane.