SEPARATION AND CONVERSION OF NUCLEAR SPIN ISOMERS OF ETHYLENE

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The separation and conversion of nuclear spin isomers with A_g, B_{1g}, B_{2u}, and B_{3u} symmetry of normal ethylene (C_2H_4) have been investigated by a newly assembled experimental setup in the first case studied so far for a planar, asymmetric-top polyatomic molecule that has four nuclear spin isomers with the D_{2h} symmetry group. One of the nuclear spin isomers of C_2H_4 is first separated using the $10P44$ CO_2 laser line in the method of Light-Induced Drift[a]. The equilibration decay curves of the spin isomers are then measured using a second probe CO_2 laser to monitor absorption spectral line intensities as a function of time. The conversion rates between isomers have been determined by fitting these decay curves to an exponential function. The experimental results and their interpretations will be presented.

[a]F.Kh. Gelmukhanov, and A.M. shalagin, JETP Lett. **29**, 711 (1979).