INVESTIGATION OF THE LOW-ENEGY CONFORMERS OF THE 1-ALKENES FROM PENTENE (C_5H_{10}) TO DECENE ($C_{10}H_{20}$)

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The rotational spectrum of the 1-alkenes from pentene to decene have been investigated at a rotational temperature of approximately 1 K using a pulsed-molecular-beam Fourier-transform microwave spectrometer. At present, two conformers have been observed for 1-pentene, 1-heptene, 1-octene, and 1-nonene, while three conformers have been identified for 1-hexene and only one has been assigned for 1-decene. For each alkene chain, the lowest energy conformer corresponds to an elongated structure. The number of conformers observed is surprisingly small given the large conformer degeneracies present in these systems. For instance, assuming three minima exist about each single bond we estimate there are $3^8 = 6561$ potential conformers for 1-decene, of which only one has been assigned in the 1 K rotational temperature molecular beam. Molecular modeling calculations are presently underway to examine the conformer energetics and to compare with the experimental results.