CONFORMATIONAL INTERCONVERSION CATALYZED BY RARE GAS ATOMS

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Molecular beams are often used to investigate intrinsic properties of clusters and molecules at low temperatures. Many molecules can have several conformations which can co-exist in a molecular beam. We have determined the relative population of two T-shaped isomers of the isotopically labeled benzene dimer (C_6H_6)(C_6D_6) in a molecular beam, using different carrier gases. These two isomers are separated by a barrier of about 64 cm^{-1} and have a subtle difference in zero-point energy of only a few cm^{-1}. Interestingly, we observe that exclusively the low energy isomer is present in the molecular beam using neon as a carrier gas whereas both isomers are observed in approximately equal amounts when helium is used. The dynamics of cold collisions between carrier gas atoms and the benzene dimer are most probably responsible for those differences. A general model explainig the observations will be presented.