

SYNTHESIS OF LINEAR C₅ AND ITS CONVERSION TO RHOMBIC STRUCTURE IN THE GAS PHASE

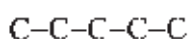
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The study of pure carbon molecules (clusters) has been of great interest for many years.¹ The understanding of structures and properties of small carbon molecules is especially interesting and important due to their involvement in combustion and pyrolysis processes, interstellar chemistry, formation and growth of fullerenes and production of thin diamond and silicon carbide films.

The most widely used laboratory technique for making carbon molecules has been the laser vaporisation of graphite, which offers no control and reveals little about the connectivity of atoms. Diederich and co-workers² have been developing techniques to systematically synthesise specific sized carbon molecules from organic processors but the efforts have been mainly for monocyclic C₁₂ – C₁₈ ring structures.

In this paper, we will present a synthesis of isotopically labelled linear C₅ from an organic precursor by double desilylation technique³ using SF₆. Charge Reversal (CR) and Neutralisation Reionisation (NR) experiments demonstrate that linear C₅ anion rearranges upon collisional oxidation. The cations and neutrals formed in these experiments exhibit different degrees of isotopic scrambling in their fragmentation patterns. The combination of experiment and theory indicates that the rhombic C₅ is formed as a cation and as a neutral following charge stripping of linear C₅.



Linear C₅



Rhombic C₅

1. Weltner W. Jr and Vanzee R.J. *Chem Rev* **1989**, 89, 1713.
2. Rubin Y : Knobler C.B.; and Diederich F. *J Am Chem Soc*, **1990**, 112 1607.
3. Dua S : Blanksby S.J and Bowie J.H *Int J Mass Spectrom*, **2000**, 195/196, 45-54