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Hot-Atom Chemistry of Carbon

The hot atom chemistry of carbon is at once, one of the most complex areas of hot atom chemistry while being one of the most easily accessible for experimental study. This stems from the fact that the chemistry of the compounds of carbon is without question the most extensively studied of the compounds of any element in the periodic table. At the same time it is perhaps the most complex because of the multivalent nature of carbon and the fact that carbon can react with itself and with many other elements in near infinite variety. Thus the remarks which follow can apply in principle to other elements which are multivalent and whose chemical reactions have been studied in the gaseous, liquid and solid states.

One of the major difficulties in placing the chemistry of energetic carbon atoms in proper focus in the field of hot-atom chemistry in general is perhaps due to the fact that many efforts have been made to oversimplify these reactions and use as models the reactions of monovalent species such as tritium, fluorine, chlorine and bromine. While such comparisons have stimulated much useful work, sweeping generalities have been made in the past which do not stand up under closer scrutiny insofar as they answered the basic questions of the nature of the chemical interactions of the primary reactive encounter and how the primary encounters affected isolable-product distribution.

In studying carbon atom chemistry a distinction that is vital to any hypothesis is a clear delineation of the chemical system. Generalizations based on reactions in one system do not necessarily apply to all systems as

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