Carbocations Encyclopedia Article

Carbocations

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Contents

Carbocations Encyclopedia Article.....1

Contents.....2

Carbocations.....3

Carbocations

Carbocations (also called carbenium ions or carbonium ions) are positively charged ions of the general formula R_3C^+. Like the negatively charged **carbanions**, they are found as intermediates in a large number of reactions, for example the dissolution of alkenes in strong acids and the dehydrohalogenation of alkyl halides.

Carbocations exhibit a broad range of stability and **reactivity**. As intermediate compounds they are unstable and rapidly converted to the product of the reaction. These intermediates can only be detected by such techniques as **nuclear magnetic resonance**. There are several stable compounds that can be formed such as triphenylmethylcarbenium and 1,3,5-cycloheptatriene carbenium (tropylium carbenium). The stability of carbocations increases depending upon whether they have one, two, or three R groups attached to the **carbon atom**.

Alkyl carbocations can be prepared by reacting the alkyl fluoride and **antimony** fluoride at low **temperature** in the presence of **sulfur** dioxide.

All carbocations are strong alkylating agents with a high affinity for groups which donate or share their electrons (nucleophiles), such as **halide** ions, hydroxyl anions and amines.

Carbocations are a group of strongly reacting molecules which are rarely encountered in their native form due to their reactivity.