BISTRIFLUOROMETHYLCYCLOPROPENES

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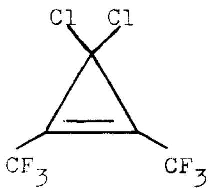
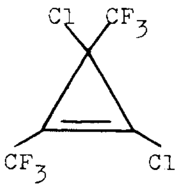
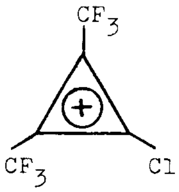
Hexafluorobut-2-yne reacts with dichlorocarbene [generated by thermal decomposition of the silane CCl_3SiF_3] to give 3,3-dichlorobistrifluoromethyl- (I) and 1,3-dichlorobistrifluoromethyl-cyclopropene (II).



(I)



(II)



(III)

The 3,3-dichloro-compound (I) is isomerised to (II) by heat, light, or chemical catalysis, but high yields of either pure cyclopropene may be obtained by modification of the reaction conditions. The cyclopropenium ion (III) is formed when either (I) or (II) is treated with antimony pentafluoride.

Both (I) and (II) undergo free-radical addition of halogens, but the slow reaction of (II) with trifluoromethyl radicals gives a mixture of products. Nucleophilic substitution of chloride ion from both cyclopropenes occurs very readily, and with ethoxide ions both mono- and di-ethoxybistrifluoromethylcyclopropenes are obtained. The cyclopropenes also react with fluoride ion, iodide ion, or Grignard compounds.