Naming Convention for CFCs & Halons

Please note: you will not be tested on this information!
It is provided in case anyone is interested 😊

Chlorofluorocarbons (CFCs) are nontoxic, nonflammable chemicals containing atoms of Chlorine, Fluorine, and Carbon. They had been used in the manufacture of aerosol sprays, blowing agents for foams and packing materials, as solvents, and as refrigerants. CFCs are classified as halocarbons, a class of compounds that contain atoms of carbon and halogen atoms. Hydrochlorofluorocarbons (HCFCs) contain Hydrogen, Chlorine, Fluorine, and Carbon and, due to their H atom, are reactive in the troposphere (the H reacts with OH to form H₂O).

Individual CFC and HCFC molecules are labeled with an archaic numbering system consisting of three integers: i, j, and k. If only two integers are given, the value of the first integer is zero. The digits correspond to:

\[ i : \text{number of carbon atoms minus 1} \]
\[ j : \text{number of hydrogen atoms plus 1} \]
\[ k : \text{number of fluorine atoms} \]

The number of chlorine atoms is found by \( \text{Cl} = 2(C+1) - H - F \), where C, H, & F represent the number of Carbon, Hydrogen, and Fluorine atoms.

Hence:

CFC-11 (CFCl₃) has \( i + 1 = 1 \) Carbon atom, \( j - 1 = 0 \) Hydrogen atoms, \( k = 1 \) Fluorine atom, and \( 2(1+1) - 0 - 1 = 3 \) Chlorine atoms.

CFC-12 (CF₂Cl₂) has \( i + 1 = 1 \) Carbon atom, \( j - 1 = 0 \) Hydrogen atoms, \( k = 2 \) Fluorine atom, and \( 2(1+1) - 0 - 2 = 2 \) Chlorine atoms.

HCFC-142 (C₂H₃F₂Cl) has \( i + 1 = 2 \) Carbon atoms, \( j - 1 = 3 \) Hydrogen atoms, \( k = 2 \) Fluorine atom, and \( 2(2+1) - 3 - 2 = 1 \) Chlorine atom.

Halon-2402 is C₂F₄Br₂ and Halon-1211 is CF₂ClBr.

Halons are fluorocarbons that contain at least one bromine and no hydrogen. The nomenclature for naming halons is simpler than CFCs, because halons use \( i j k l \), where \( i = \text{number of carbon atoms} \), \( j = \text{number of fluorine atoms} \), \( k = \text{number of chlorine atoms} \), and \( l = \text{number of bromine} \).