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Topic: Alkyl halides
SciLinks code: HC60047

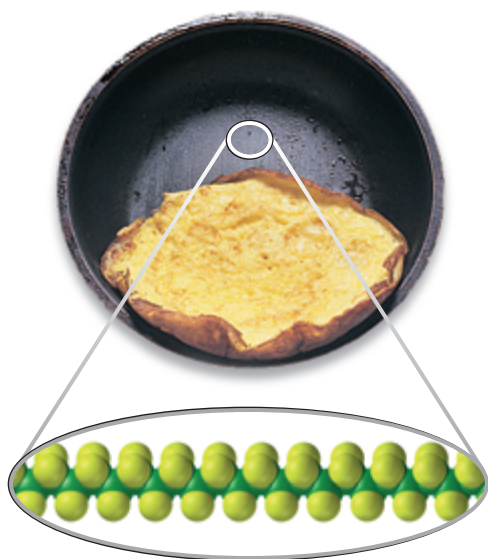


FIGURE 13 The nonstick coating on this pan is made of Teflon, an alkyl halide.

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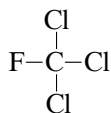
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Topic: Ethers
SciLinks code: HC60537

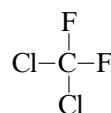
Alkyl Halides

Alkyl halides are organic compounds in which one or more halogen atoms—fluorine, chlorine, bromine, or iodine—are substituted for one or more hydrogen atoms in a hydrocarbon. Because $-X$ is often used to represent any halogen, an alkyl halide may be represented by the general formula $R-X$.

Alkyl halides are some of the most widely used organic chemicals. A family of alkyl halides that has received widespread attention in recent years is the chlorofluorocarbons, or CFCs. CFCs are alkyl halides that contain both chlorine and fluorine. The formulas for two widely used CFCs, Freon-11 and Freon-12, are shown below.

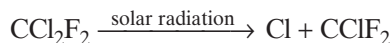


trichlorofluoromethane
(Freon-11)

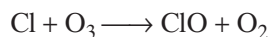


dichlorodifluoromethane
(Freon-12)

CFCs, which have been used as liquid refrigerants, contribute to the destruction of ozone in the upper atmosphere. When released into the atmosphere, CFCs can break down and release free chlorine atoms.



The released chlorine atoms attack molecules of ozone, O_3 , found in the upper atmosphere. The ozone is converted to diatomic oxygen.



Chlorine atoms are eventually regenerated in various ways, including the reaction of ClO with O .



This makes it possible for a single chlorine atom to destroy thousands of ozone molecules. Because CFCs are a major cause of ozone depletion, more than 100 nations signed an agreement in 1987 to reduce the amount of CFCs produced.

Another alkyl halide is tetrafluoroethene, C_2F_4 . It is joined in long chains to make a material with the trade name Teflon[®]. Because of the unreactive carbon-fluorine bond, Teflon is inactive and stable to about 325°C . It also has a low coefficient of friction, which means that other objects slide smoothly over its surface. These properties enable Teflon to be used in heat-resistant machine parts that cannot be lubricated. It is also used in making utensils with “nonstick” surfaces, such as the frying pan in **Figure 13**.

Ethers

Ethers are organic compounds in which two hydrocarbon groups are bonded to the same atom of oxygen. They can be represented by the general formula $R-O-R'$. In this formula, R' may be the same hydrocarbon group as R or a different one. Like alkanes, ethers are not very reactive compounds, so they are commonly used as solvents.