Editorial Note on Understanding Halogens

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EDITORIAL NOTE

Any of the six nonmetallic elements that make up Group 17 (Group VIIa) of the periodic table is halogen. Fluorine (F), chlorine (Cl), bromine (Br), iodine (I), astatine (At), and tennessine (Tn) are the halogen components (Ts). Since they all contain sodium salts with similar properties, they were given the name halogen, which comes from the Greek roots hal- ("salt") and -gen ("to produce"). The free halogen elements are not present in nature due to their high reactivity. Fluorine is the most abundant halogen in the Earth's crust in its combined form. 0.06 fluorine, 0.031 chlorine, 0.00016 bromine, and 0.00003 iodine are the percentages of halogens present in Earth's crust igneous rocks. Since they are made up of only short-lived r, astatine and tennessine do not exist in nature.

The free element is commonly used as a water purification agent and in a variety of chemical reactions.

One of the most well-known chemical compounds is table salt, or sodium chloride.

Fluorides are best known for their use as a tooth decay preventative in public water systems, but organic fluorides are als o used as a refrigerant.Iodine is best used as an antiseptic, while bromine is mostly used to make bromine compounds, w hich are used in flame retardants and pesticides. In the past, ethylene dibromide was widely used as a leaded gasoline ad ditive. In their diatomic forms, all halogens have oxidation state 0. The oxidation states of fluorine are 1 (F ion) and +1 (F ion) (hypofluorous acid). Chlorine, bromine, and iodine have oxidation states of 1, +1, +3, +5, and +7, respectively. Oxyacids are compounds that include halogen atoms and oxygen atoms. All of the oxyacids are powerful oxidizers that can be reduced. In the process, the oxidation numbers change from positive to one. The oxyanions' oxidising power increases as the halogen atom's oxidation number increases. Tetrahedral molecules and ions are those in which halogen atoms have four valence electron pairs, such as the perchlorate ion (ClO4). Chlorine trifluoride (Cl) is an example of a compound of five valence electron pairs. Structures resulting from a trigonal bipyramidal arrangement of electron pairs are found in compounds with five valence electron pairs, such as chlorine trifluoride (ClF3). However, since structure-based techniques do not locate electron lone pairs (i.e., electron pairs that do not bind atoms together), only the locations of fluorine atoms (attached to bonding pairs) are visible. As a consequence, ClF3 has a T shape as a result of fluorine atoms being positioned at both the axial and one equatorial position of the trigonal bipyramid, with lone electron pairs in the other two equatorial positions. Molecules with six valence electron pairs have structures that are derived from the electron pairs' octahedral geometry; for example, iodine pentafluoride (IF5) has a square pyramidal structure. Five of the six octahedral electron pairs bond with fluorine atoms, resulting in a fluorine molecule. The pentagonal bipyramidal arrangement of fluorine atoms in the binary compound iodine heptafluoride (IF7) makes it unique.