

Fluoride and tooth decay

Halogens are located in group 17; they are non metals and occur in combined form in nature. Halogens are found in the rocks of the earth's crust and dissolved in sea water. As you go down the group the reactivity decreases; fluorine being the most reactive and Astatine being the least reactive. Their atoms have 7 electrons in their outer shell. And finally, halogens have a low boiling point. Fluorine is a pale yellow toxic gas that has the symbol F and atomic number 9; it is the lightest halogen and is the most reactive element. There are many important and useful uses of halogens in life, example Fluorides are included in toothpaste and water supplies to help prevent tooth decay.

*In the 1940s, scientists have noticed that people living in communities that have natural water supplies with high concentrations of fluoride ions, F^- , have significantly lower rates of tooth decay than most of the population.*¹ Tooth enamel is the tissue that makes up the tooth; it is the thin outer covering of the tooth. It is a rocklike material made mostly of calcium hydroxyphosphate, also known as apatite. It can be dissolved, however sometimes saliva can become more acidic especially for a person who consumes a lot of high-sugar foods. Acids ionize to produce hydronium ions that react with the hydroxide ion (OH^-) in the apatite which then forms water. Therefore the loss of hydroxide ion causes the apatite to dissolve. New apatite is formed when saliva supplies more hydroxide ions. If there are fluoride ions in the saliva, some fluorapatite also forms which resists attack by acids, so the tooth enamel resists decay better than enamel containing no fluoride. Fluoride is found in foods and in water, it can also be applied to the teeth through fluoridated toothpastes and mouth rinses.

Fluoride may be useful in reducing tooth decay however; there have been some concerns that fluoride may be linked to a variety of health conditions. The first disadvantage is that Fluoride may damage the brain. According to the national research council (2006), *"it is apparent that fluorides have the ability to interfere with the functions of the brain"*² Animal experiments show that fluoride gathers in your brain and alters mental behavior. Over 100 animal experiments showed that fluoride can also impact learning and behavior. Another disadvantage of the use of fluoride in toothpaste is that it can affect thyroid function. According to the U.S. national

¹ Sarquis, Mickey, and Jerry L Sarquis. *Holt McDougal Modern Chemistry*. Orlando, Fla.: Holt McDougal, 2012. Print.

² connett, paul. 'Fluoride Action Network | 50 Reasons To Oppose Fluoridation'. *Fluoridealert.org*. N.p., 2012. Web. 19 Nov. 2014.