

Hydrogen uses, purposes, and compounds

[Environment](#), [Water](#)



Hydrogen is recognized as the simplest and lightest chemical element in the periodic table; even though it is identified as one of the top elements in abundance in the world (consisting of 0.9 percent of the total mass on earth), it is considered to be the most abundant element in the entire universe. It is a gaseous element with the atomic symbol being H. It is usually categorized under the first group of the periodic table known as the alkali metals. It contains only one electron that revolves around one single energy level and it is the only element that is able to exist without any neutrons in its nucleus. It is diatomic, meaning that its molecules are composed of 2 atoms, yet it is able to break off into free atoms when placed in high temperatures. Hydrogen is tasteless, odorless, and colorless consisting of a melting point of -259.2°C , a boiling point of -252.77°C , and a density of 0.089 g/liters. It is highly flammable element that burns and constructs dangerous and explosive mixtures and reacts destructively with oxidants. Most of the time hydrogen is identified as a nonmetal, however there are occasions in which it becomes a liquid metal. This is caused when immense amount of pressure is added to it such as when it's found in gas like planets including Jupiter and Saturn. Hydrogen consists of 3 isotopes including hydrogen-1, known as protium, hydrogen-2, deuterium, and hydrogen-3, tritium. The first isotope is the most abundant one, while the third one is the least. Henry Cavendish, an English scientist who developed hydrogen by mixing zinc along with hydrochloric acid, first identified it as a distinct element in 1766. However, Antoine Lavoisier, a French scientist, named it in 1783. The name came from the Greek word "hydro", which means water and "genes" meaning forming since it is one of the two

elements that make up a water molecule. Hydrogen has a variety of purposes but it is widely used for the hydrogenation of vegetable and animal fats and oils. Many food companies use it for the production of margarine from liquid vegetable oil. Petroleum and chemical industries as well use a significant amount of hydrogen in order to remove sulfur from natural gases, this process is known as hydrodesulfurization, and to break down complex chemicals into simpler ones, hydrocracking. Hydrogen also has uses in engineering and physics, it used as a shielding gas for welding by separating the welding site from other gases such as oxygen and nitrogen. There are a significant amount of compounds formed by hydrogen, which include hydrogen chloride consisting of the formula HCl and classified as a chloride. It is a colorless gas that has a melting point of -114.2°C , a boiling point of -85.1°C and a density of 1187 kg . It can be made by reacting sulfuric acid with sodium chloride. Another compound formed is hydrogen fluoride with has the formula of HF and is classified a fluoride. It is a colorless gas with a melting point of -83.5°C , a boiling point of 19.5°C , and a density of 1000 kg . The dry hydrogen fluoride gas can also be made in the laboratory in a large scale by reacting calcium fluoride with sulfuric acid. A third compound is hydrogen bromide, which has the formula HBr and is classified as a bromide. It is a colorless gas with a boiling point of -67°C , a melting point of -88.6°C , and a density of 2603 kg . It can be produced in the laboratory by reacting hydrogen gas and bromine. A fourth compound is known as hydrogen iodide that has a formula a HI and is classified as an iodide. It is a colorless gas that has a melting point of -51°C , a boiling point of -35°C , and a density of 2850 kg . It can be made in the lab by reacting hydrogen gas and iodine. A fifth

compound is known as hydrogen persulphide, which has a formula H_2S_2 and is classified as a sulfide. It has a boiling point of $71^\circ C$, a melting point of $-90^\circ C$, and a density of 1334 kg . It is synthesized in the lab by dissolving alkali or alkali earth metal polysulfide in water. A sixth compound made from hydrogen is hydrogen selenide with the formula of H_2Se and classified as a selenide. It is a colorless gas and has a boiling point of $-42^\circ C$, a melting point of $-66^\circ C$, and a density of 2120 kg . It can also be made in the lab by reacting aluminum selenide with water. A seventh compound is ammonia with the chemical formula NH_3 , classified as a nitride. It is a colorless gas that has a boiling point of $-33.33^\circ C$, a melting point of $-77.74^\circ C$, and a density of 0.6175 at $15^\circ C$. It is made in the lab by reacting hydrogen with atmospheric nitrogen using a magnetic catalyst. An eighth compound is hydrogen sulfide with the formula of H_2S and is classified as a sulfide. It is a colorless gas that has a boiling point of $-60.3^\circ C$, a melting point of $-85.6^\circ C$, and a density of 993 kg . It is synthesized in the lab by reacting calcium sulphide, magnesium chloride, and water together. It is collected by condensation yielding about 80%. The ninth compound is hydrazine, which has the formula of N_2NH_2 and is classified as a nitride. It is a colorless gas that has the boiling point of $113.5^\circ C$, a melting point of 2.0 , and a density of 1.0036 . It is synthesized in the lab from ammonia and hydrogen peroxide. The last compound is hydrogen telluride with the formula H_2Te and classified as a telluride. It is a colorless gas with a melting point of $-49^\circ C$, a boiling point of $-2^\circ C$, and a density of 5687 kg . It is synthesized by the reaction of Na and Te in anhydrous ammonia. The use of hydrochloric acid is used for small-scale application such as purification of common salt, leather processing, and

household cleaning. Oil production can be stimulated by injecting hydrochloric acid into the rock into the rock formation of an oil well creating a large pore structure. Hydrogen fluoride is used to make refrigerators gasoline, aluminum, plastic, electrical components, and fluorescent light bulbs. Ammonia is the number one ingredient for fertilizers, it is used to remove stains and tarnish, and it is the ideal solution to remove soap buildup in tubs and sinks. Water is used for basic human survival, it is an important compound that every creature needs in order to sustain life. It is used for drinking, cleaning, cooking, washing, and growing food. Hydrogen peroxide is used to clean wounds and prevent infections; it is a general disinfectant.