

Hydrogen and Thallium

One element is the most abundant in the universe; the other is poisonous and banned in the United States. Despite these differences, they still have some features in common.

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Hydrogen and Thallium are both elements on the Periodic Table of Elements. They are both found on Earth, and in the time since their discoveries, they – and compounds created with the elements - have been put to use by humans.

Hydrogen

Being that it is the first element on the periodic table and the most plentiful element in the universe, Hydrogen is quite well-known. Hydrogen's **atomic number** is 1, which means that it has one **proton**.

Hydrogen is a *non-metal* and a *gas*.



A hydrogen-fueled car

Hydrogen is present in many different **compounds**. Water (H_2O) is where most of the Hydrogen in the world is found. Hydrogen can be

used in metal refining and as rocket and automobile fuel.

Hydrogen-powered cars have become more common as awareness about diminishing fossil fuels grows.

Atomic number – the number of protons in the nucleus of an atom, which determines the chemical properties of an element and its place in the periodic table

Proton – a positively charged particle that resides within the atomic nucleus

Compound - A substance formed by the reaction of two or more chemical elements

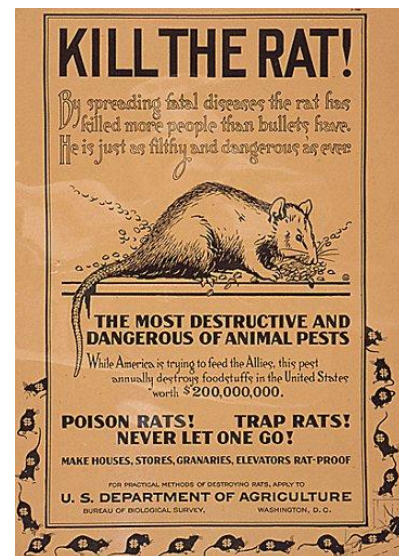
Thallium

Whereas Hydrogen has only one proton, Thallium has 81 protons, and consequently its atomic number is 81 since the atomic number signifies the number of protons an element has.

Thallium is a *metal* and a *solid*. Thallium can be found in minerals and can be combined with other elements to make **compounds**, such as Thallium Sulfate and Thallium Sulfide (photocells).

While Hydrogen makes up about 10% of the weight in living organisms, when

Thallium is found in living organisms, such as humans, rats, and insects, it can have a toxic effect. Thallium is toxic and is commonly used in rat poisons and insecticides. Because it is poisonous to humans as well, the United States banned products that contained Thallium in 1972. Thallium is still used as an ingredient in poisons in other parts of the world and in gamma radiation detection equipment and thallium stress tests.



A poster encouraging the use of Thallium poison to kill rats

Not Entirely Different

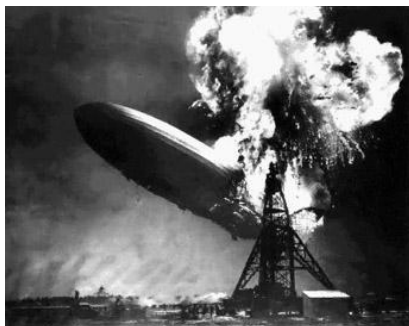
Clearly, when looking at appearance, uses, and many other characteristics, Hydrogen and Thallium appear to be poles apart; however, there are some likenesses between the two. For instance, both elements were discovered in England. Hydrogen was discovered by

Henry Cavendish in 1766, and Thallium was discovered by William Crookes in 1861. Also relating to the unearthing and identification of these elements, is the fact that the **origin** of both their names is Greek. Hydrogen comes from the Greek word “hydro”, meaning water and “genes”, meaning forming. Thallium comes from the Greek word “Thallos”, meaning green shoot or twig because of the green lines it forms.

Origin (of name) - the meaning of a name; often from another language

Despite the fact that Hydrogen and Thallium have many variations, there are some qualities or characteristics that they share. Overall, one would much rather drink a compound of Hydrogen (water) than one that contained Thallium, but both elements have benefits and dangers.

Many people do not know that, like Thallium, Hydrogen can also be dangerous. Hydrogen bombs (commonly called H-bombs) are incredibly destructive. In addition, though hydrogen is still used for rocket fuel and for Hydrogen-powered cars, blimps now use Helium instead of Hydrogen. Originally, Hydrogen was used because it is light, easy to acquire, and cheap. However, Hydrogen is flammable, and after the Hindenburg disaster in 1937 when a blimp filled with Hydrogen caught on fire and was destroyed, they discontinued the use of Hydrogen in blimps.



The 1937 Hindenburg Disaster

Though Hydrogen is generally a non-metal, when under extreme pressure, Hydrogen can become a liquid metal. In this way Hydrogen and Thallium are similar in **classification**.

Classification - qualities shared with a metal, non-metal, or metalloid