14. Hydrostik

A safe and convenient means of transporting and storing hydrogen

Overview

The Hydrostik provides a refillable source of hydrogen for hydrogen-powered appliances.

How it works

Each Hydrostik cylinder holds 10 litres of hydrogen gas. Commercial gas cylinders generally compress gas, and then require a regulator to access the gas safely. The Hydrostik utilises the chemical properties of hydrogen to bind the gas to a metal alloy inside the cylinder to form a safe and stable metal hydride, without having to compress and store the hydrogen at high pressure.

Why is this important?

Identifying and developing alternative sources of power to fossil fuels has been one of the greatest challenges of recent times. Introducing people to the simple fact that there are alternative ways of providing energy, aside those commonly found in renewable energy demonstrations is a good way of exploring the topic of sustainable energy production further. Although hydrogen is not in itself considered a source of energy, it does provide an exciting means of transferring energy. The challenge simply remains to make it in a sustainable manner.

The Secret World of Gases uses these Hydrostiks as one way of providing the hydrogen fuel cells with hydrogen. The Hydrogen powered bus (Activity 16) and the Hydrogen house (Activity 18) are both electrical appliances that have been converted to run on a supply of hydrogen. The Hydrostik is refilled using a Hydrofill desktop electrolyser (about the size of a kettle) or bottled gas. The Hydrofill is an electrolysis unit, which uses standard DC power to separate tap water into its constituent parts, hydrogen and oxygen.

> “Introducing people to the simple fact that there are alternative ways of providing energy”

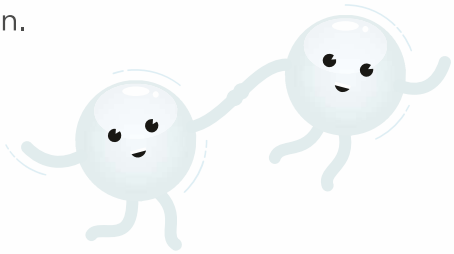
More stories to tell

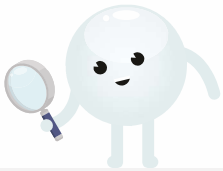
What can the Hydrostik be used for?

The Hydrostik is used to supply hydrogen to a hydrogen fuel cell or hydrogen fuel cell stack, which can use elemental hydrogen to create electricity. This process is explored further in section 15 (Hydrogen fuel cells) but essentially the hydrogen is split into its protons and electrons. The flow of electrons gives the supply of electricity. Anything that requires an electrical current can be theoretically powered by a combination of the correct specification of hydrogen fuel cells and a supply of hydrogen.

Is hydrogen a source of energy?

It is important to think of hydrogen as a carrier of energy, not as a source of energy. Without a suitable means of spitting hydrogen into its protons and electrons, hydrogen cannot be used to supply an electrical current. This gives two challenges to solve before we can think of using hydrogen as a means of providing energy. The storage of hydrogen (the Hydrostik is one method) and the production of hydrogen (See activity 15 for more on this).





SECRET GAS FACT

Hydrogen can also be stored as a compressed gas, as a liquid or in other compounds such as ammonia (NH_3). Research at CERN has also looked at producing antihydrogen, an antimatter element produced in particle accelerators that is among the costliest materials ever made, at $62.5 trillion per gram.