

# Time to change, from Helium to Hydrogen!

## What happens with Helium?

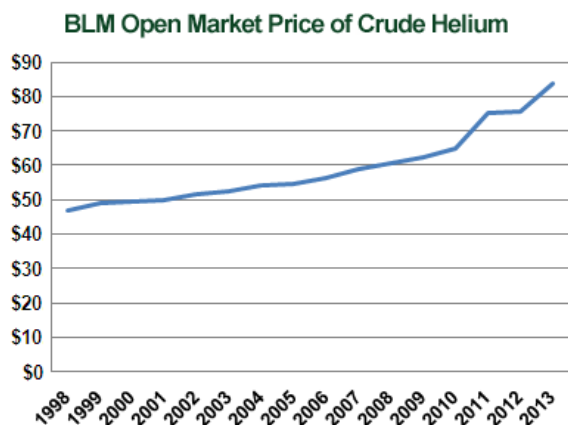


Fig. 1 Price of helium rising

Even if helium is the second most abundant element in the universe, it's relatively rare on earth, trapped underground with natural gas and mined by the natural gas industry.

Since decades it has been used for a large spectrum of high tech applications without consideration regarding the fact that it is a non-renewable resource.

The Bureau of Land Management—which controls the National Helium Reserve (NHR)—estimates that 0.45 billion m<sup>3</sup>, or around 60 percent of the U.S. national reserves, have now been sold, many scientists are predicting that a possible critical shortage of helium could happen in approximately 25 years!

Of course, as stocks reach lower and lower levels, prices have risen steadily in the last decade. In just one year (2012-2013) the price increase has been the same than during the first 2000 decade (Fig. 1).

Helium is essential and cannot be substituted in the largest laboratory use, but an available alternative exist for gas chromatography with high purity hydrogen.

## Changing to hydrogen

But today GC users can avoid future troubles by switching their carrier gas requirements using hydrogen. Practitioners looking to switch to hydrogen can get numerous guides and software packages to help the process and expedite the changeover. When done, this change will generate several benefits, covering technical and economic aspects:

**Cost savings**— hydrogen is a less expensive carrier gas alternative and users won't have to support any cost increase

**Supply security** - GC users will no longer experience supply issues as hydrogen is an abundant and renewable resource,

**Speed** - Hydrogen has the lowest viscosity at any temperature, so it will produce higher velocities at a given pressure drop (Fig. 2)

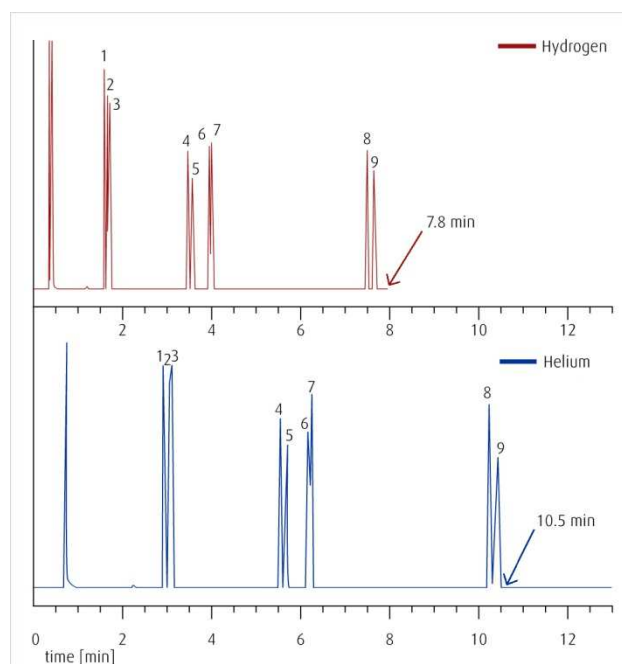


Fig. 2 GC speed and peak increase with hydrogen

**Productivity** - The reduction of noise and analysis time in comparison to helium and nitrogen, has a positive impact on the throughput of the laboratory

**Less spares**— Hydrogen use allows to decrease the temperature for separation, improving the column longevity

**Availability**— It can be generated with water everywhere

## The right solution, on-site H<sub>2</sub> production

Today the benefits of the hydrogen use for GCMS applications are supported and expanded by on-site generators. As it can be generated everywhere with water electrolysis, the storage and supply of bulky gas cylinders will be a thing of the past. Convenience improvement is a key benefit recognized by users of gas generators. More precisely this means an improvement on ergonomics, safety and productivity.

## Higher safety levels with hydrogen generators

A main argument against hydrogen concerns safety because it can form an explosive mixture with air. But for many reasons, a growing number of laboratory analysts are using hydrogen generators as strong security improvements are generated:

**Minimal storage of hydrogen** - from 2000l of gas at 200 bar cylinders down to only 40ml, low enough that the laboratory air can never build up to explosive levels

**Automatic shut down** - on internal or external (between generator and column) leak detection by accurate pressure monitoring)

**Leaks risk reduction** - when changing cylinders removing 50 connections and associated risks of leakages and mistakes!

**Gas on demand** - Generator provides only the necessary amount of gas that is send directly to the GC

**No transport** - Tanks are bulky and transporting them to the laboratory may lead to an accident

**Air control** - Remote hydrogen sensors can continuously check if hydrogen is released to the atmosphere



Fig. 3 LNI Swissgas generators are installed on the most critical locations

## Why change with LNI Swissgas?

Since more than 30 years LNI Swissgas develops and manufactures top range performance hydrogen generators for laboratories.

LNI Swissgas H<sub>2</sub> generators have three unique features when compared to others:

**Compact** - the smallest footprint of the market, up to less than half the surface occupied by other generators!

**Efficient** -99.9999% high purity hydrogen is generated at the lowest power consumption, down to 0.4 W/L

**Secure** - More than 6 securities are preventing any potential risk. Even earthquake / shock sensor for automatic shutdown are contributing to the generator safety



Fig. 4 The HG6.0 of range H<sub>2</sub> generator

So do not hesitate anymore and contact us to have more information!

Represented by: