

## The Agilent HydroInert GC/MS Source: Simplifying the Switch from Helium to Hydrogen

Even though helium is the second most abundant element in the universe, it's relatively rare on earth – and that rarity is a cause for concern that reaches well beyond party balloons and silly voices. In its liquid state, helium is an essential coolant for the superconducting magnets that make MRI scans and high-resolution NMR possible, and its inertness makes it ideal for science and industrial techniques ranging from arc welding to crystal growth to mass spectrometry.

However, the combination of necessity and rarity don't suggest a particularly sustainable – or cheap – situation. Thus, a great deal of development work has been, and continues to be, focused on finding alternative ways to achieve needed outcomes while reducing dependence on a dwindling resource – without compromising quality.

The uncompromised quality aspect is particularly important to Dr. Britney Prestridge. As an analytical R&D scientist at Indorama – a provider of specialty chemicals to a broad range of industries – Dr. Prestridge takes quality very seriously. Among her responsibilities is ensuring the safety and performance of Indorama products, and her lab uses powerful analytical techniques such as gas chromatography paired with mass spectrometry (GC/MS) to make sure batch after batch of product meet the standards of both Indorama and the regulatory requirements in the markets they serve.

### Making the switch to hydrogen

Faced with the growing uncertainty around helium access casting a shadow over the future of their analytical processes, Indorama looked for an alternative approach that wouldn't sacrifice quality. The answer: the Agilent HydroInert source, which allows the use of hydrogen rather than helium as a GC/MS carrier gas. Engineered for use with hydrogen, the HydroInert source features materials that minimize undesirable side reactions that might otherwise occur and reduces the need for source maintenance, due to the cleaning effect of hydrogen.



Dr. Britney Prestridge

R&D Analytical Manager  
Indorama Ventures

Cheap and plentiful, hydrogen has a lot going for it – but it still needs to deliver the results. “When I joined Indorama, the decision had already been made to move to hydrogen, and a lot of that decision was based on the expense of helium and uncertainty about its continued availability,” Dr. Prestridge said. “My experience using the Agilent 5977 GC/MSD system equipped with the HydroInert source has been that the performance of hydrogen is really good. In selected ion monitoring mode, I see a great response in calibrations using hydrogen and the HydroInert source. There are usually minor changes that need to be made to methods to make the switch, but it offers faster analysis, and with the HydroInert source, we get the same reliability we saw with helium.”

“At my site, we have one GC/MS and five GC FID instruments using hydrogen, and more of our sites are being converted,” she continued. “The economics of hydrogen are compelling, and the situation with helium is only going to get worse. If we generate hydrogen on-site, it can be an order of magnitude cheaper than helium, so the per-sample analytical costs are a lot lower, and there aren’t any unforeseen delays, no downtime waiting for a helium tank to show up. Ultimately, Indorama is part of a supply chain; this transition is an essential part of showing our customers that we can continue to deliver the products they need in the quantity and quality they expect from us.”

Aided by the HydroInert source, the decision to switch from helium to hydrogen is being extended to other parts of the organization. “One of our QC labs has now brought in the HydroInert source and they’re seeing really nice calibration curves,” Dr. Prestridge said. “I talked to them recently about their parameters and it looks like they’ve only made very minimal changes to their methods. So, it has been an easy conversion for them too, which is fantastic, because you don’t really want to overly complicate the QC process.”

The views and opinions expressed herein are those of Dr. Prestridge and do not necessarily reflect the views or positions of Indorama Ventures Oxides LLC.

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## Covering all the bases

From an economics and performance perspective, then, switching from helium to hydrogen seems like a bit of a no brainer. But what about safety? After all, helium is inert, while hydrogen rather spectacularly isn’t. Did Dr. Prestridge express any safety concerns? “Obviously, any time you work with hydrogen, safety has to be factored in, but with the advanced sensor technology and safety features that are available, it’s really a solved problem. We’ve never had any safety concerns about using hydrogen in our analyses. Generating hydrogen on-site eliminates whatever issues might come along with storing a lot of hydrogen tanks. We just approach it with the same attitude we apply to every lab safety matter; as long as you have the right equipment, the right protocols, and the right training in place, you can just get on with doing the work.”

Despite its drawbacks, helium use still outstrips hydrogen in many analytical labs. Have there been any issues getting the support they needed to keep their workflows moving? “There’s already a large and fast-growing body of resources available to guide you through the conversion from helium to hydrogen, and Agilent has been my best friend through all of this,” Dr. Prestridge said. “I think by now they know me every time I call. It’s really nice to be able to call someone and ask, ‘So, with helium I used this column. What do I need to use with hydrogen? What would be best for unknowns?’ They’re probably my favorite company for getting technical support about anything.”