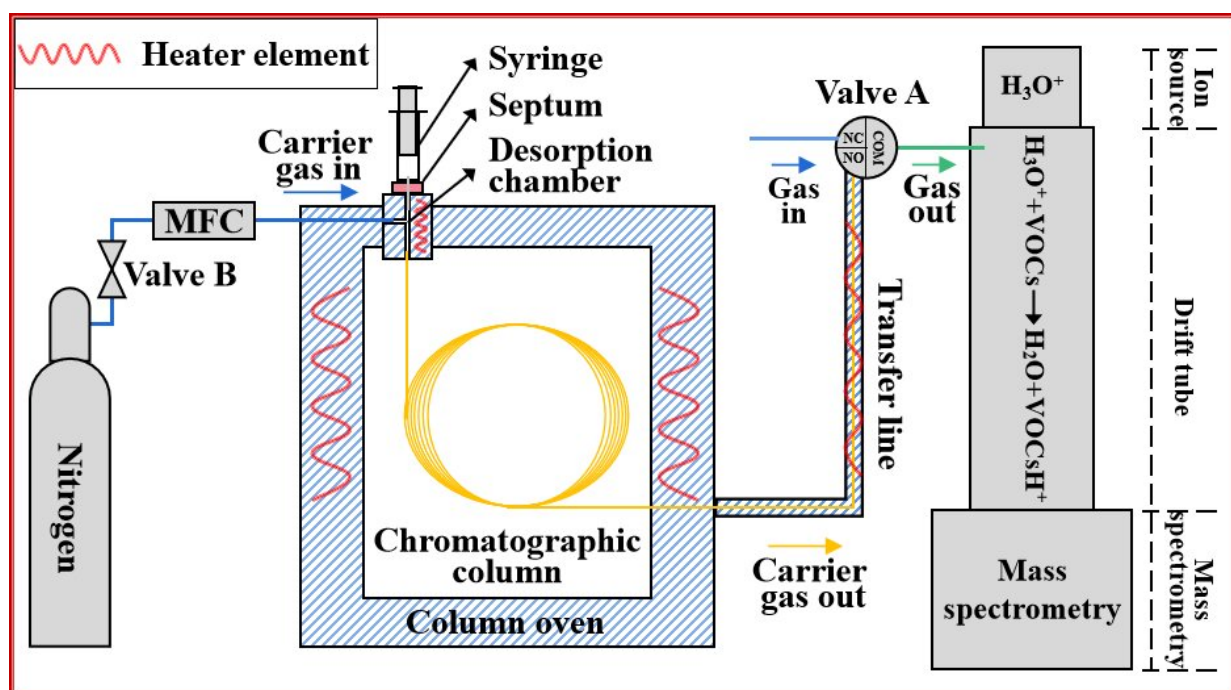


Butanol in latex paint detected by mass spectrometry technology

July 28 2022, by ZHANG Nannan



Schematic diagram of the FastGC-PTR-MS. Credit: Sun Qin

According to a study published in *Journal of Chromatography A*, using fast gas chromatography proton transfer reaction mass spectrometry (FastGC-PTR-MS) technology, a research team led by Prof. Sheng Chengyin and Associate Prof. Zou Xue from the Hefei Institutes of Physical Science (HFIPS) of the Chinese Academy of Sciences (CAS) has detected butanol in latex paint, an organic solvent whose isomers,

tert-butanol, is toxic and potentially harmful to human body.

Proton transfer reaction mass spectrometry (PTR-MS) and gas chromatography mass spectrometer (GC-MS) are two common volatile organic compound (VOC) detection technologies. PTR-MS technology is quick and sensitive but it can only identify the VOCs based on mass charge ratio (m/z), which means that it is impossible to distinguish VOCs with the same [molecular weight](#), such as [isomers](#). And GC-MS is time-consuming because of the chromatographic separation process and complex sample pretreatment.

To solve these problems, the researchers built a tandem technology FastGC-PTR-MS, combining the advantages of rapid detection of PTR-MS with the separation and qualitative capabilities of GC-MS.

And they optimized the developed [technology](#) with standard samples of several common VOCs.

They successfully separated the isomers. The retention times of acetonitrile, acetone, alcohols and benzene series were all less than two minutes, two to six times shorter than that of commercial GC-MS.

They then applied FastGC-PTR-MS to detect the isomers of butanol in latex paint, and found that the headspace of brand D latex paint mainly contained tert-butanol (4.41 ppmv), n-butanol, acetaldehyde, methanol, and acetone. The concentration of tert-butanol was well below the maximum allowable concentration in the workplace (100 ppmv).

"FastGC-PTR-MS can be used for rapid qualitative and quantitative detection of isomers," said Sun Qin, first author of the study.

More information: Qin Sun et al, Qualitative and quantitative determination of butanol in latex paint by fast gas chromatography

proton transfer reaction mass spectrometry, *Journal of Chromatography A* (2022). [DOI: 10.1016/j.chroma.2022.463210](https://doi.org/10.1016/j.chroma.2022.463210)

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