An innovative water management device for on-line and canister-based thermal desorption analysis of trace-level VVOCs and VOCs in high-humidity ambient air

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Both canister and on-line sampling are useful techniques for monitoring trace-level vapours in ambient air using thermal desorption (TD). The canister approach involves collecting air into a canister followed by off-line TD–GC analysis, while the on-line method involves the transfer of air directly into the TD–GC system for real-time analysis. These methods are useful alternatives to tube-based sampling when the compounds of interest are too volatile to be retained by sorbent tubes at ambient temperature – for example, hydrogen sulfide.

However, major issues arise when using either of these techniques to sample air streams with high humidity. Specifically, lowered sorbent breakthrough volumes and cold-trap ice formation can lead to lower maximum sample volumes and increased method detection limits, while the presence of water in the GC column can cause poor chromatography.

Removal of water from canister and on-line samples is therefore paramount, but existing approaches have major drawbacks. For example, certain polar species and ultra-volatiles can be lost when using Nafion™ dryers, while very volatile compounds can be lost when using a trap temperature of 25°C.

This poster will describe an innovative water-management device that is available for canister-based and on-line TD configurations. The system works by selectively removing water prior to analyte focusing – allowing high sensitivity on-line analysis of polar species, oxygenates and pinenes (as well as all other typical VVOCs and VOCs) in humid environments.