

APPLICATION NOTE

Detection and Identification of *Stachybotrys chartarum* Microbial Volatile Organic Compounds (MVOCs) On-Site Using the HAPSITE ER™ and Thermal Desorber Sampling System (TDSS)

Water damage in residential and commercial buildings provides optimal conditions for toxigenic mold and fungal growth, potentially leading to severe health problems. A concern since the 1980s has been Sick Building Syndrome (SBS) and Damp Building-Related Illnesses (DBRI) which include neurological, immunological and pulmonary diseases. SBS and DBRI have been etiologically linked to toxic mold and fungal growth in water-damaged structures. Unique Microbial Volatile Organic Compounds (MVOCs) produced by these molds and fungi can be detected and identified to establish the extent and severity of mold growth. *Stachybotrys chartarum*, one of the more toxic molds associated with SBS and DBRI, can be identified by its characteristic MVOCs. Using the HAPSITE ER and TDSS, these MVOCs can be sampled and analyzed on-site, allowing users to locate mold quickly and easily.

A custom mixture of *S. chartarum* MVOCs at 1000 µg/mL was injected into a 1 L polytetrafluoroethylene bag containing Ultra High-Purity (UHP) nitrogen for a

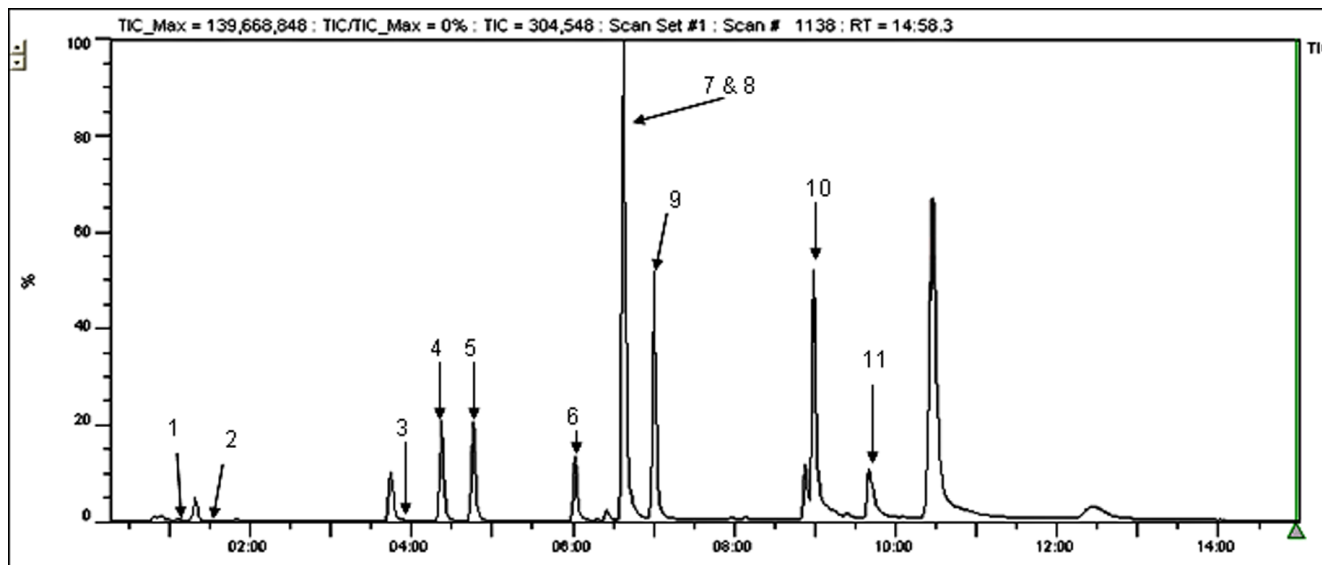
target concentration of ~200 µg/m³. Each compound with concentrations in part-per-billion-per-volume are shown in Table 1. The carbon-based thermal desorber (TD) tube was used to sample the MVOC mixture with an ideal sampling volume of ~250 mL. The carbon TD tube was then inserted into the TDSS accessory attached to HAPSITE ER. The analytes were desorbed from the TD tube at 300°C for 5 minutes and then trapped onto the on-board Tri-Bed carbon concentrator tube. The analytes were then thermally desorbed from the concentrator onto the column for a 20-minute analysis. Figure 1 shows the labeled chromatogram with temperature profile; exact retention times are found in Table 1.

The ability to detect MVOCs characteristic of certain toxic mold can be detected and identified using the HAPSITE ER and TDSS. The ability to quickly locate the source of the toxins aids in the efficiency of the remediation process.

Table 1: MVOCs with Retention Time and Concentration

Compound Number	Compound	Concentration (ppbv)	Retention Time
1	Propanoic acid methyl ester	61	1:18
2	Acetoin	61	1:45
3	3-Furanmethanol	55	3:53
4	Styrene	51	4:22
5	Anisole	49	4:45
6	3-Octanone	42	6:00
7	3-Methylanisole	44	6:40
8	4-Methylanisole	44	6:40
9	Limonene	39	7:00
10	Naphthalene	42	9:00
11	3,5-Dimethoxytoluene	35	9:40

Figure 1: Chromatogram Showing MVOCs



Column: HP-1MS, 15 m, 0.25 mm ID, 1.0 µm df

Temperature Profile: 60°C (hold 1 min.) to 80°C at 3.0°C/min, to 120°C at 6.0°C/min, to 180°C at 26°C/min (hold 4 min.)



www.inficon.com reachus@inficon.com

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