Supelco®
Analytical Products

MERCK

Sustainability Advantages of Thermal Desorption for VOC Analysis

Thermal desorption tubes are commonly used in air monitoring applications to collect and analyze Volatile Organic Compounds (VOCs) in ambient, indoor, and workplace air. VOCs are emitted from products of daily use or emitted during the manufacturing of polymers, adhesives, paints, petroleum products or pharmaceuticals. The best approach is to use air sampling products that reduce the amount of waste produced when carrying out the sample prep of the tubes used to collect VOC air samples.

The thermal desorption workflow involves adsorbing the VOCs onto a sorbent material packed in the tube during sample collection, followed by applying heat and inert gas flow through the tube to (desorb) transfer the VOCs to a gas chromatograph for analysis.

The environmental monitoring market uses thermal desorption tubes extensively to measure the levels of VOCs in air samples as part of many air quality monitoring programs in order to comply with environmental regulations.

Thermal desorption is considered a greener alternative when compared with solvent desorption as it allows for a less toxic and less waste-producing workflow.

Sustainability Benefits of Thermal Desorption Tubes

1. **Reusable:** Most thermal desorption tubes are reusable at least 50 to 100 times which reduces waste, making the workflow more sustainable.
2. **No solvent usage:** Since thermal desorption uses heat and inert gas instead of toxic solvents to extract the VOC's of interest, it eliminates the need for solvents such as: CS_2 carbon disulfide which is extremely toxic to humans and should be eliminated whenever possible.

3. **Reduced accessories waste:** Single-use accessories such as transfer vials, caps and pipette tips are not needed, since the sample collection and desorption takes place directly on the TD tube. This also reduces pollution from solvent use during sample prep or disposal after analysis.

4. **Increased sensitivity levels:** The compounds being analyzed via thermal desorption are desorbed directly from the tube without any sort of dilution step making it a more sensitive workflow. The alternative, solvent desorption, is less sensitive since the samples are diluted 100-1000x fold during the solvent extraction step.

5. **Minimal sample prep:** TD tubes require minimal sample preparation, reducing the time and labor needed to perform the sample workflow.

Our Supelco® line includes a comprehensive selection of adsorbent tubes – Carbotrap® tubes – offering superior performance for trapping and thermally desorbing organic compounds. This includes both stainless steel and glass-fritted pre-packed sampling tubes that are fully compatible with PerkinElmer®, Gerstel TD 3.5+, Markes, DANI-Analytica, GL Science Handy TD and Shimadzu thermal desorbers.

Our Carbotrap® line of thermal desorption tubes are packed with our unique carbon adsorbents, along with our many years of experience with packing quality tubes. Use our guide below to assist in choosing the most appropriate Carbotrap® thermal desorption tube for your application:

Product Name	Adsorbent	Applications
Carbotrap® 100	Carbotrap® B	C5-C12 compounds in air
Carbotrap® 150	Glass beads, Carbotrap® C	Large molecules in air or aqueous samples
Carbotrap® 200	Glass beads, Carbotrap® B, Carbosieve™ S-III	C2-C14 compounds in air
Carbotrap® 201	Carbopack™ B, Carboxen® 1000	Focusing semi-volatile to very volatile compounds
Carbotrap® 202	Carbopack™ B, Carbopack™ C	C5-C20 compounds in air
Carbotrap® 217	Carbotrap® B, Carboxen® 1000	TO-17 compounds and other volatile compounds in air
Carbotrap® 300	Carbotrap® C, Carbotrap® B, Carbosieve™ S-III	C2 and larger compounds in air
Carbotrap® 301	Carbopack™ C, Carbopack™ B, Carboxen® 1000	Focusing volatile and semi-volatile compounds
Carbotrap® 302	Carbopack™ C, Carbopack™ B, Carboxen® 1001	Volatile compounds in aqueous solutions
Carbotrap® 317	Carbotrap® C, Carbotrap® B, Carboxen® 1000	TO-17 compounds and other volatile and semi-volatiles in air
Carbotrap® 349	Carbopack™ Y, Carbopack™ B, Carboxen® 1003	NIOSH 2549: Volatile organic compounds
Carbotrap® 370	Carbopack™ F, Carbopack™ C, Carbopack™ B	C5-C30 compounds thermally extracted from solid samples; focusing semi-volatile compounds
Carbotrap® 400	Carbotrap® F, Carbotrap® C, Carbotrap® B, Carboxen® 569	C2 and larger compounds in aqueous samples
Carbotrap® T420	Proprietary	Terpene compounds in air

See Our Complete Thermal Desorption Portfolio Here:

SigmaAldrich.com/thermal-desorption

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