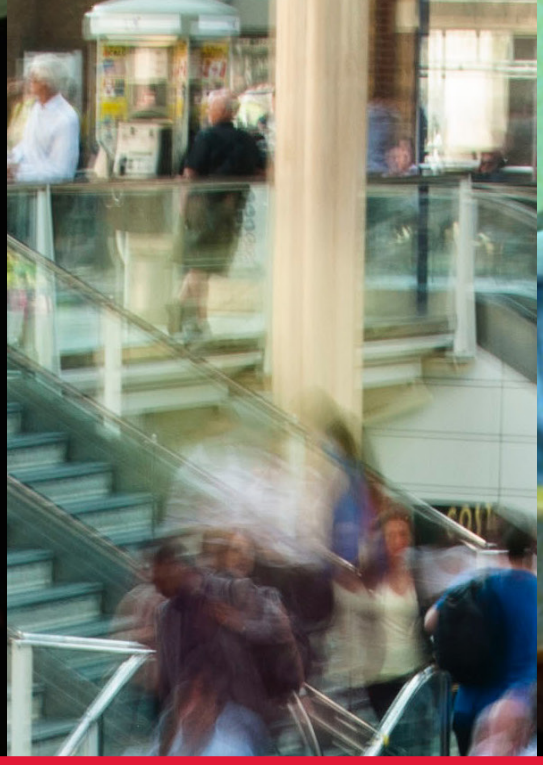
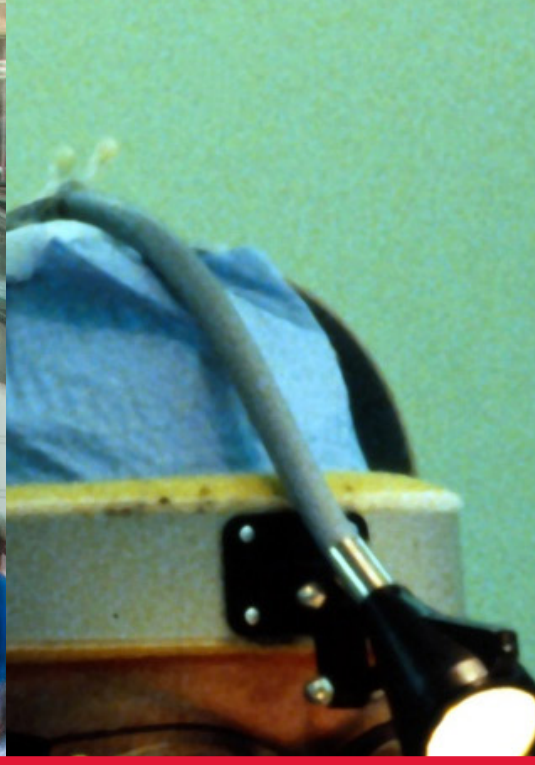
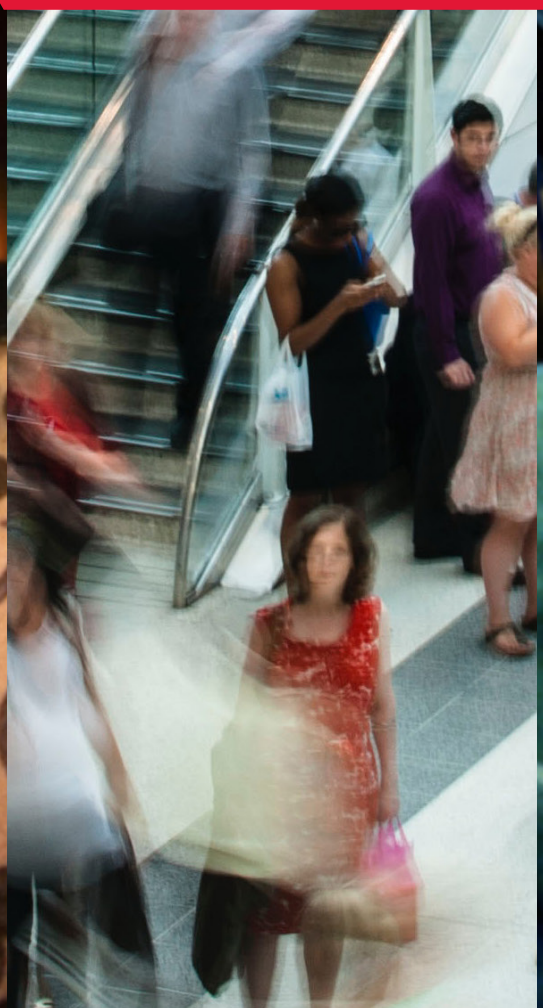




SOLUTIONS FOR BREATH RESEARCH & HUMAN HEALTH

SYFT TECHNOLOGIES



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syft™ Technologies

BREATH RESEARCH AND MEDICAL SOLUTIONS UTILIZING SIFT-MS

Volatile organic compounds (VOCs) and certain inorganic gases (such as nitric oxide, NO) are byproducts of a range of metabolic processes in living organisms. Variations in emitted compounds for a particular condition offers the opportunity to use these compounds as markers of ill health by comparing profiles from the unwell with those from the "healthy normal" population. Better known human examples include ammonia and amine odors on the breath of people with kidney conditions, and solvent-like odors on the breath of diabetics in a state of ketosis. Volatile compounds also offer potential for rapid discrimination between species (e.g. microbes) because of the different profiles arising from differing metabolic pathways.

Rapid instrumental detection of volatile biomarkers has proved challenging due to the complexity of the matrix, the low concentrations of the compounds, and the high humidity. Selected ion flow tube mass spectrometry (SIFT-MS) is the first technology to successfully address all of these challenges, and provide simplicity of operation. This brochure outlines several SIFT-MS-based breath and medical research solutions provided by Syft Technologies. SIFT-MS is a versatile tool applicable to a wide range of analytical scenarios.

POPULATION SCREENING

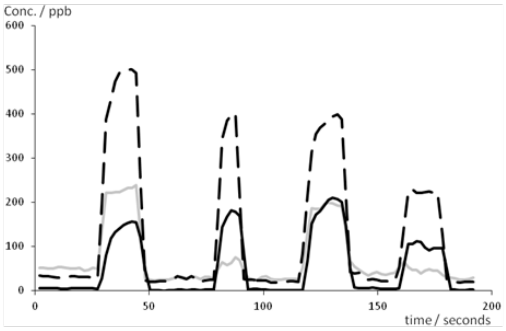
Practical screening of large populations via breath testing requires:

- Low operating and consumable costs
- Simple sample collection and analysis
- High throughput
- Immediate, understandable reporting of analytical results.

The Syft Technologies' breath testing solution delivers all of these requirements, making rapid, high-sensitivity population screening feasible for the first time.

Applications of SIFT-MS-based population screening include:

- Groups at higher risk of suffering from diabetes, kidney disease, respiratory conditions, etc.
- Assessing exposure following a pollution incident
- Verification of non-smoking status prior to insurance policy or claim approval.



Population screening by SIFT-MS: single breaths from four individuals. Acetone (dotted line), isoprene (black), and ethanol (gray) data are shown

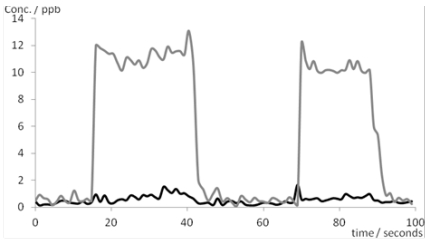
BREATH RESEARCH

The SIFT-MS technique provides rapid, high-sensitivity analysis of VOCs and certain inorganic gases on breath with no sample preparation and no compound discrimination. Benefits include:

- Real-time analysis of individual breath exhalations
- Analytical results unaffected by sample humidity – no sample drying is required
- Very wide linear and dynamic range
- Flexibility – analyze directly or via sampling media, such as sampling bags.

Applications of SIFT-MS-based breath analysis include:

- Disease marker screening
- Kidney medicine
- Non-invasive diabetes screening
- Respiratory medicine
- Intensive care medicine
- Monitoring anesthetics during surgery.



Single breath SIFT-MS analysis for hydrogen cyanide (gray) and hydrogen sulfide (black)

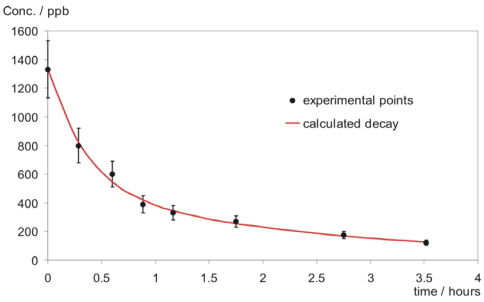
MONITORING TEMPORAL CHANGES IN BREATH PROFILES

Rapid analysis of breath or the headspace of blood and urine samples using SIFT-MS enables much more detailed analysis of temporal trends than is possible with other techniques. This provides greater insight into how the body metabolizes the introduced pharmaceutical or chemical.

Applications of continuous monitoring include:

- Pharmacokinetic studies, when pharmaceuticals are administered that yield volatile metabolic byproducts
- Monitoring changes when alternative therapeutic strategies are invoked, such as optimizing dialysis treatment
- Investigating the effects of exposure to particular VOCs, either in a controlled study, or through a workplace accident or environmental pollution incident

Rapid reporting of breath analyte concentrations and trends at point of care has the potential to guide timely therapies.



Decay of mesitylene in a volunteer's breath after a two-hour controlled exposure, measured using SIFT-MS. The solid line represents a two-reservoir fit to the experimental points

MICROBIAL RESEARCH

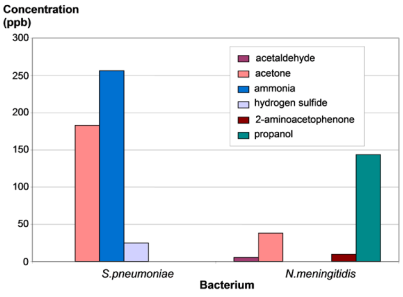
Microorganisms emit VOCs as part of their normal metabolic processes. These VOCs often provide a unique "fingerprint" for each microbial species cultured on a particular culture medium.

SIFT-MS eliminates many of the issues associated with other techniques used to analyze volatile metabolic products:

- Faster answers – a shorter incubation period is required due to the high sensitivity of SIFT-MS
- Higher sample throughput because:
  - Analysis is rapid and highly immune to water
  - No headspace preconcentration is required
- Results are presented immediately in an easily understandable manner.

Applications of SIFT-MS in microbial research include rapid, consistent detection of:

- Blood poisoning bacteria
- Organisms causing urinary tract infections
- Food pathogens and spoilage organisms.



VOC concentrations for two bacteria in blood after incubation for eight hours

SUMMARY

Syft Technologies' SIFT-MS instruments offer unparalleled opportunities for highly sensitive, selective and non-discriminatory VOC analysis in diverse breath and microbial research applications, including:

- Non-invasive screening of large populations that may be at higher risk of certain medical conditions or have been exposed to hazardous substances;
- Real-time, ultra-sensitive and highly selective analysis of breath for VOCs that indicate medical conditions;
- Profiling temporal changes in VOC concentrations in breath or body fluid, such as in pharmacokinetic and therapeutic scenarios;
- Rapid identification of microorganisms from their distinct VOC "fingerprint".

Syft Technologies' is committed to its customers' success, delivering simplicity of operation, fully integrated solutions, user-friendly software, product reliability and extensive after-sales support.

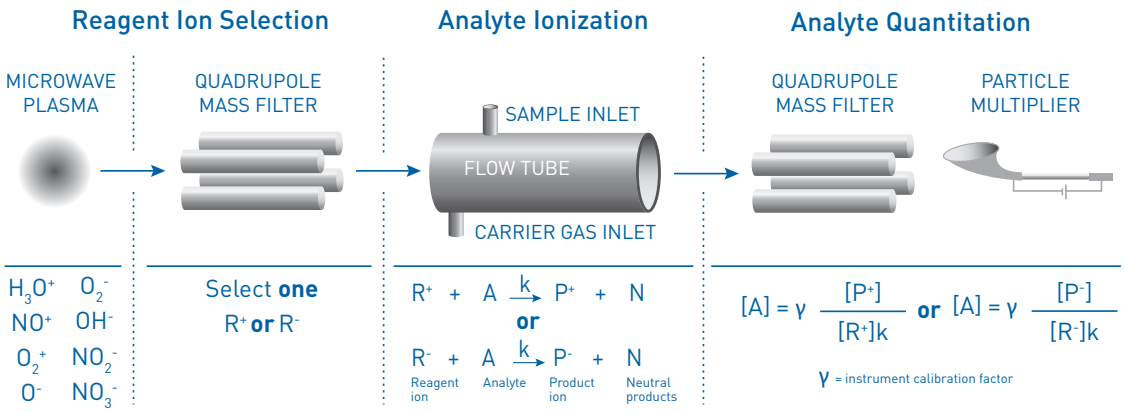
SELECTED ION FLOW TUBE MASS SPECTROMETRY (SIFT-MS)

SIFT-MS is the leading real-time analytical technique for comprehensive gas analysis to ultra-trace levels.

SIFT-MS uses ultra-soft, precisely controlled chemical ionization coupled with mass spectrometric detection to rapidly quantify VOCs and permanent gases to low part-per-trillion concentrations by volume (pptv). Eight chemical ionization agents (reagent ions) are applied in Syft instruments: H_3O^+, NO^+, O_2^+, O^-, O_2^-, OH^-, NO_2^-, and NO_3^-.

These eight reagent ions react with VOCs and inorganic gases in very well controlled ion-molecule reactions but they do not react with the major components of air (N_2, O_2, and Ar). This enables SIFT-MS to analyze air at trace and ultra-trace levels without preconcentration.

Rapid switching of eight reagent ions provides unsurpassed selectivity among direct MS techniques.



BENEFITS OF SYFT SIFT-MS INSTRUMENTS

- Instantaneous identification and quantitation of VOCs and inorganic gases using a fully integrated, extensive chemical ionization library
- Real-time air analysis to low part-per-trillion by volume (pptv) concentrations with class-leading selectivity, no preconcentration, and high robustness to humidity
- Analysis of chemically diverse VOCs in a single analysis (e.g. aldehydes, amines and organosulfur compounds)
- Ease of operation with push-button simplicity (including smartphone access), no sample preparation, and comprehensive LabSyft data analysis software
- Designed and engineered for use in commercial, industrial and research environments, with easy integration into sample delivery systems and IT infrastructure
- Reliable, low maintenance instruments and accessories, with market-leading after-sales support

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Not for use in diagnostic procedures.

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