version 1.0
8 Oct 2013

Gasmet™ FTIR application note

Anesthetic gases – point monitoring

KEY WORDS

- Anesthetic gases: Nitrous oxide, desflurane and sevoflurane
- Fourier Transform Infrared (FTIR)
- Occupational hygiene

PRODUCTS

- DX4040 Portable FTIR Gas Analyzer
- FCX-series Stationary FTIR Gas Analyzer
- MSS Multipoint sampling system (up to 32 gas streams)

OVERVIEW

Anesthetic gases include two different classes of chemicals: nitrous oxide and halogenated agents. Most commonly used halogenated agents include desflurane and sevoflurane (previously also halothane and isoflurane).

Anaesthetic gases which leak into surrounding air during medical operations can cause the medical staff to experience nausea, dizziness, headaches, fatigue and even more serious conditions such as cancer. For this reason there are strict limits for anaesthetic gas concentration in air.

The medical staff can be exposed to waste anesthetic gases in many ways: gas can escape from around the patient's anesthesia mask, there may be leaks in the anesthesia system or gas may escape during purging of the system. Also, patients exhale anesthetic gases even days after the surgery.

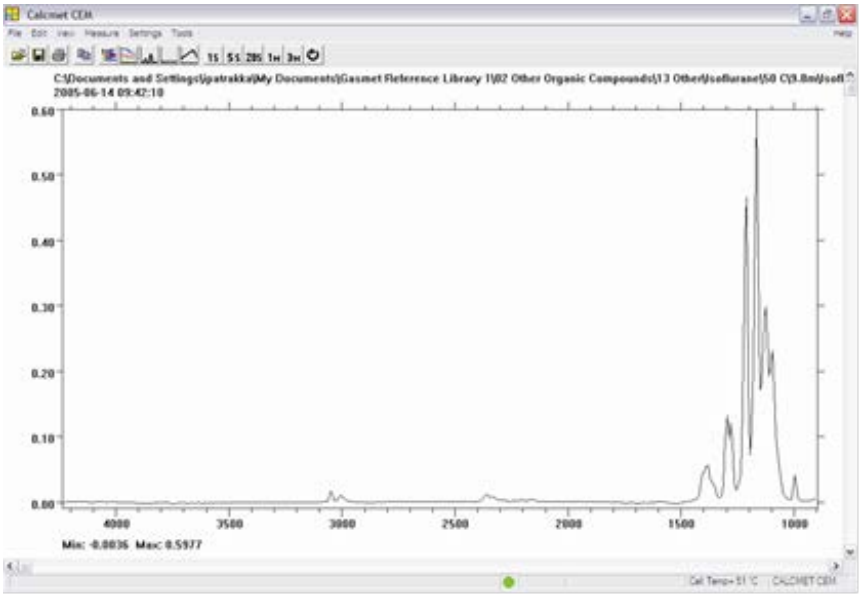
Gasmet™ FTIR analyzers are ideal for on-site measurements of anesthetic gases because:

- Measurement results are available on-the-spot – no sample preparation is needed. Measurement time can be as short as 5 seconds.
- Dozens of gases can be analyzed simultaneously. In fact, one Gasmet™ FTIR gas analyzer can measure up to 50 gases at once.
- With lesser devices cross-interferences can cause problems. This is especially the case in places like hospitals where alcohols like ethanol and IPA are used for disinfecting and cleaning. With Gasmet™ FTIR analyzers cross-interference is not a problem.
- Gasmet™ also continuously measures H_2O and CO_2 concentrations. It's therefore well suited for use in high-humidity conditions.
- Some analyzers provide only concentration data but very little to validate the data. With Gasmet™ FTIR gas analyzer it's possible to save the sample spectra, which contains all information about the analyzer parameters and the sample gas. This ensures that post-measurement evaluation of the results can be made.
- Traditionally, FTIR analyzers have been relatively difficult to use – this is not the case with Gasmet™. User does not require any previous experience with analytical instruments. Analysis methods are ready-made at factory. It's naturally also possible to change these settings later on, should the need arise.
- No span calibrations are needed – only zero calibration with nitrogen before the start of measurements. This saves time and money.

version 1.0
8 Oct 2013

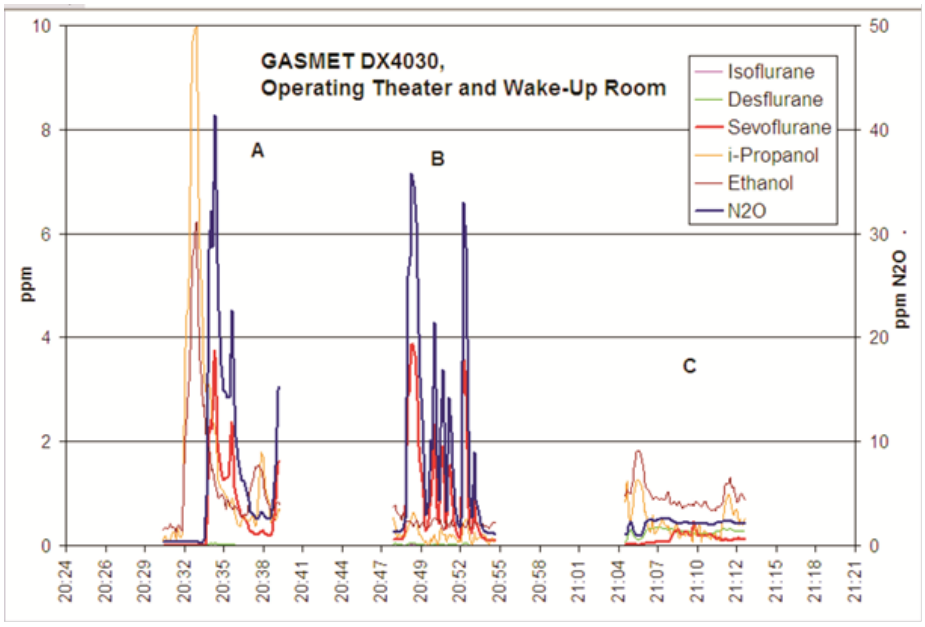
Case Study: *Isoflurane monit*oring in an operating room

Isoflurane ($C_3H_2ClF_5O$) FTIR spectrum
Detection limit in ambient air: 0.1 ppm.
Gasmet™ FTIR gas analyzers offer very low detection limits for both N_2O and halogenated agents. Typically they are well below 0.5 ppm for all these gases in ambient air.



APPLICATION EXAMPLE:
Measurement data from a hospital (three measurement points):

1. In operating theater close to patient's mask. In addition to high concentration of anesthetic gases, there's also IPA and Ethanol from disinfecting.
2. Wake-up room: patient exhales anesthetic gases after surgery.
3. Same place later in the evening: concentrations of gases are starting to decrease.



Gasmet Technologies Oy
Helsinki, Finland
TEL : +358 (9) 7590 0400
EMAIL : *contact@gasmet.fi*
WEB : *www.gasmet.fi*

Gasmet Technologies Inc
North America
TEL : +1 866 685-0050,
EMAIL : *sales@gasmet.com*
WEB : *www.gasmet.com*

Gasmet Technologies (Asia) Ltd
Hong Kong
TEL: +852 3568-7586
EMAIL: *sales@gasmet.com.hk*
WEB: *www.gasmet.fi*