LSE NH_3-1700

air monitoring of Ammonia

[Industrial air]

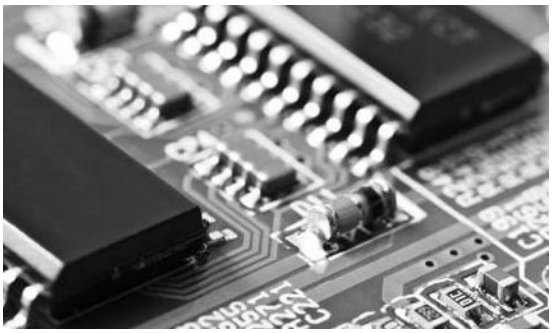
A new solution for air pollution monitoring

LSE Monitors has developed a robust and cost-effective analyzer based on photo acoustics with a quantum cascade laser.
The concentration of NH_3 in sample air is continuously determined with a detection limit of 1 ppb and a time resolution of 2 minutes.

Continuous ammonia measurements in industrial air

Several industrial activities make use of the physical and chemical properties of NH_3.

Converting nitrogen oxides into N_2 and H_2O can be realized by adding NH_3 to a stream of flue or exhaust gas in the presence of a catalyst. This process is known as *selective catalytic reduction*. Applications can be found on industrial boilers, large diesel engines and even in automobiles.
The efficiency of removing fly ash from the boilers of power plants by means of an electrostatic precipitator can be enhanced by injecting NH_3 to the stream of exhaust gas.
In semiconductor industry, NH_3 is an unwanted species. Its presence in low concentrations (as low as 2 ppb) may drastically deteriorate the performance of lithographic processes.



- *Very low detection limit (ppb range)*
- *No consumables, turnkey instrument*
- *Active gas sampling by integrated pump*
- *Virtually maintenance-free instrument*
- *User-friendly software*
- *Large color graphics with touch screen*
- *CE certified*
- *Two-year warranty*

www.lsemonitors.nl | info@lsemonitors.nl

LSE monitors
De Deimten 1 | Groningen | the Netherlands
tel.: +31 (0) 50 526 64 54

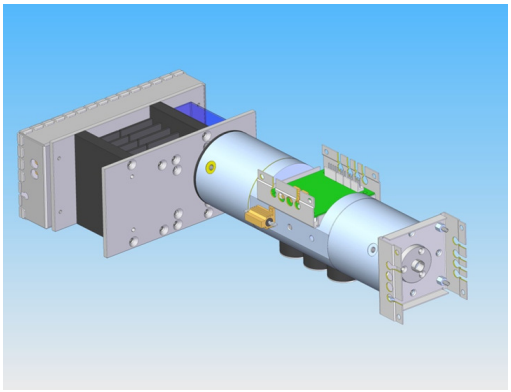
LSE MONITORS

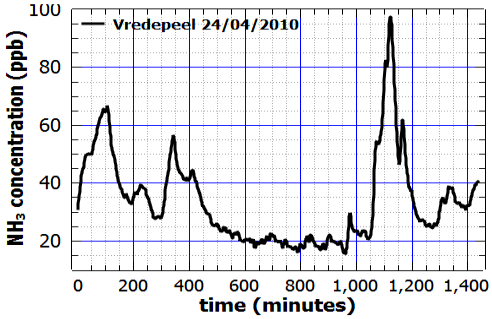
LSE Monitors

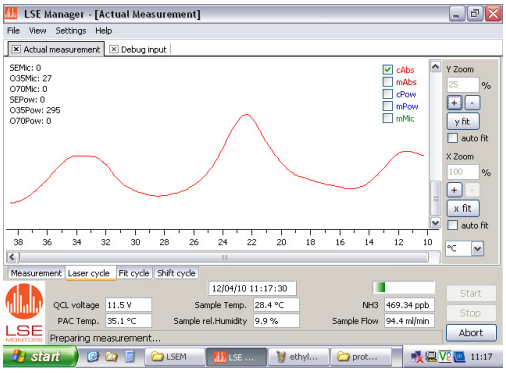
LSE Monitors is a joint venture between Sensor Sense BV in Nijmegen and Synspec BV in Groningen, combining knowledge of laser research, electronic design and analyser production.

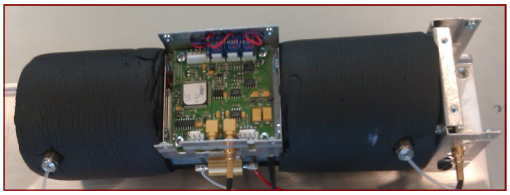
Concept of measurement

Infrared light produced by a quantum cascade laser is directed through a measurement cell. This cell is continuously flushed with sample gas. An integrated pump sucks ambient air through the monitor. If ammonia is present in the sample gas, the pressure increases as a result of absorption of the laser light. The laser light intensity is modulated at an acoustic frequency of 1600 Hz and the resulting pressure modulation is measured by small microphones. The amplitude is proportional to the ammonia concentration.









Specifications

Noise (1σ, 120 s)	1 ppb
Range	0 - 8 ppm, on request tuneable to 200 ppm
Precision	a maximum precision of 2 ppb or 2 % of measured value, whichever is the biggest
Time resolution	120 s
Response time ($T_{10\text{-}90\%}$)	< 5 min
Linearity	tbd
Sample flow rate	40 ml/min

Calibration

Interval	we advice every 30 days, at least once every 6 months
Calibration gas	Preferrably 5 ppm NH_3 in a mixture of N_2/O_2 in the ratio 4:1

Requirements

Sample temperature	5 - 30°C
Sample pressure	stable during measurements, 0.7 - 1.0 atm
Sample humidity	non-condensing for T > 25°C and relative humidity between 0 and 90%
Sample composition	Non-corrosive gases in the sample; if corrosive gasses are expected, please contact us!
Voltage supply	230 Vac, 110 Vac available on request
Coating of gas connections	we advice PFA or Silcosteel
Tubing material	we advice PFA tubing
Gas connections	Swagelock compatible, 1/8''

Technical data

Dimensions	suited for installation in 19" rack, 3 Standard Height Units (12 cm), depth 37,2 cm
Weight	8 kg
Power demand	200 W
Communication connections	1 x Ethernet, 1 x RS232, 4 x USB 4 x Analogue and 7 x Digital outputs 4 x Analogue and 4 x Digital inputs
Protocols available	Hessen-Bayern

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