NON-DEGRADABLE

OPTICAL GAS SENSOR

for Ammonia and environmental control

Riga, September 7th, 2022

The technology describes the new type of Optical Gas Sensor for ammonia (NH3), carbon dioxide (CO2) and Volatile Organic Compound (VOC) detection and concentration measurements. Novel approach to the gas sensing method allows to use unique materials and design, which ensure several main advantages compared to other electronical sensors available on the market:

* Resistance against chemical degradation, caused by ammonia and VOCs;
* Immune to electromagnetic interference;
* Wider selectivity of different VOCs;
* Low power consumption;
* Efficient at low temperatures down to -40°C
* Small size;
* IoT connectable.

 VOCs and ammonia are organic chemicals that evaporate easily into the air and create potentially toxic conditions in the work environment. Many industries have a need to monitor the presence and concentration of ammonia and VOC. Ammonia and other harmful substances such as benzene, toluene, formaldehyde, acetone and other chemicals can cause various health problems, so must be identified in the air as faster as possible to avoid poisoning of personal and environment.

 Chemical degradation of sensors is a particularly important problem for ammonia detection. Having a background level of ammonia over time sensors could become fully consumed and useless should a gas leak occur.

 For other market applications, like poultry and animal farming, frequently need for changing the sensing element makes additional expenses.

Our solution offers stable and reliable ammonia and VOC detection and concentration measurement, suitable for both industrial and home use, for air quality control. Miniaturized design and low energy consumption open new ways of installation and possibilities to integrate into existing monitoring systems and IoT platforms (Figure 1.)



**Long life and stability:** there are no electrical parts in the gas sensitive element, so it is 100% immune against chemical degradation of catalyst as well as against electromagnetic interference, therefore could be used in places where electronic sensors are not suitable.

**Wide selectivity**: different types of claddings can be used for wide selectivity of different VOCs and ammonia.

**Absolute measurements:** Device sensing mechanism can allow to determine the absolute amount of ammonia or specific VOC in air, as only ammonia and VOC molecules influence refractive index changes and it is proportional to molecule amount per cm3.

**Power supply:** thanks to the sensor is an all-optical type, it has very low power demand. Only the laser source and optical detectors for output measurements consume electricity.

**Sensitivity:** varies depending on the gas.

**Output signal:** all standard output options available – 4-20 mA, digital.

**Response Time:** 0.8-1.3 s various VOCs and 0.5 s for water

## IP STATUS

Intellectual Property is protected in know-how regime and can be patented, according to the Freedom-to-Operate search results, performed by FORAL Patent Law Office in August, 2022.

The patent application currently is under development.

Contacts

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