Detection of air pollutants

R+D Result

Patent

Knowledge Area

- Analytical Chemistry
- Environmental safety
- Occupational Safety

Collaboration

- Technology available for licensing
- Other collaborations

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Passive sensor for in situ detection of amines in atmospheres

Inventors:
Pilar Campins, Yolanda Moliner, Rosa Herráez, Carmen Molins, Jorge Verdú and Neus Jornet (Universitat de València).

Background: Nitrogenous compounds such as ammonia and aliphatic amines are particularly hazardous air pollutants due to its toxic and odorous characteristics. Aliphatic amines found in high concentrations in air are the result of their extensive use in certain types of chemical industry, used for example as raw materials or intermediates in the preparation of fertilizers, pesticides, surfactants, pharmaceuticals, polymers, dyes, etc..

For the determination of amines in situ and in real time, one possibility is to use active sampling techniques, although these techniques often depends on an external source of energy, specific equipment for sampling and, in some cases, energy costs to consider. Regarding passive sensors, there are few options for detecting amines and all have drawbacks such as the need for pretreatment prior to use, or excessively high detection limit, which prevents their use in real atmospheres with low concentration of amines.

The invention: Researchers at the University of Valencia have developed a **passive colorimetric sensor for in situ detection of amines in air** with detection limits up to 3 mg/m^3, making it suitable to use in the detection of amines in real atmospheres.

The sensor embedded in a malleable and manageable silicone matrix, is a passive sensor which does not require any kind of pre-treatment, or power supply or external instrument. The sensor is further characterized by its safety to the environment, its stability against a wide range of temperatures and to humidity and solar radiation, and its resistance to reversion, so that the sensor response is stable over time.

Applications: The sensor developed is applicable in **personal and collective safety** systems, **environmental control** systems for the detection of aliphatic amines in air, produced in many **chemical companies**, and for the control of aliphatic amines due to the degradation of foods, especially fish, useful for **food industries**.

Advantages: The main advantages provided by the invention are:

- **Simplicity and ease of use**: it is a passive colorimetric sensor that does not require any kind of pretreatment or power supply or external instrument.
- **Low cost**: simple fabrication process without high costs
- **Low detection limits**: suitable for use in real atmospheres, of the order of 3 mg/m^3.
- **Quantitative detection**: direct quantitative detection can be carried out by diffuse reflectance of the sensors.
- **Stability**: against a wide range of temperatures and to humidity and solar radiation. Reversion resistance.

OTRI oficina de transferència de resultats d'investigació

Avda. Blasco Ibáñez, 13
46010 Valencia (España)
Tel. +34 96 3864044
otri@uv.es
www.uv.es/otri

Additional information