SUCCESS STORIES

VOC-IDS: Volatile Organic Compound Indoor Discrimination Sensor

PROJECT DESCRIPTION

Solid state gas sensors based on SnO2 and other metal oxides are today the most sensitive of the low cost sensors for Volatile Organic Compounds (VOC). While the sensors are quite robust, metal oxide gas sensors show limited selectivity and long term stability. Selectivity to certain VOC can be improved by optimizing the sensitive layer (sensing material, specific dopants, and catalysts) and using sensor arrays composed of several sensors. A low cost VOC sensor for control of ventilation in buildings would allow a considerable reduction of energy consumption. However, using a broad spectrum VOC sensor is not optimal, i.e. expend too much energy in unnecessary air renewal, because of triggering ventilation due to non toxic compounds like Valeric Acid (perspiration) under smell threshold if it is sensitive enough to detect low concentrations of harmful or dangerous compounds.

The objective is to develop a unique new generation metal oxide gas sensor associated with a smart heater management and data processing in order to identify and evaluate the concentration of the above mentioned compounds. This smart sensor with data processing shall replace regular VOCT (VOC Total) sensors already incorporated in existing IAQS probe like the E4000 from NanoSense.

As metal oxides have different sensitivity to certain compounds versus temperature, the targeted innovation is to modulate the sensitive layer temperature (using steps or slopes) in order to identify and evaluate the concentration of the most significant VOCs. The microstructured ceramic sensor platform itself has to be optimized for this new sensor system as current thick film gas sensors require comparatively large heating power and have high thermal time constants. A new membrane type ceramic substrate with a membrane thickness of ~10 µm will reduce power consumption and thermal time constants and thus bridge the gap between conventional sensors and Si-based sensors which do not provide sufficient sensitivity and life time today.

The expected result is a sensor system based on a single (or maximum two) low cost sensor(s), possible with multiple sensing layers, able to identify and quantify the most relevant indoor VOCs with a recognition rate of over 90% allowing efficient air renewal.

mnt-era.net

SUCCESS STORIES

PARTNERS

Project coordinator: USAAR-LMT, **Germany**

Project partners: NanoSense, **France**
CSTB, **France**
UST, **Germany**
3S, **Germany**
Weinzierl, **Germany**
C.I.A.T., **France**

PROJECT DURATION AND TOTAL PROJECT COST:

Duration: 01/01/2011 – 31/12/2013
Cost: 1,862,000 Euro

CONTACT:

Coordinator: Prof.Dr. Andreas Schuetze
e-mail : schuetze@LMT.uni-saarland.de
Tel : +49 681 302 4663