COMMERCIAL METAL OXIDE SENSOR SENSITIVE TO HIGHER ALKANE

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OBJECTIVES

- Breath analysis by electronic noses for cancer screening requires the selection of sensors that detect cancer biomarkers
- A large amount of studies on cancer biomarkers have found that higher alkanes are likely biomarkers[1-2]. Higher alkanes are usually not well detected by commercial metal oxide sensors[3]. A group of sensors is being tested to evaluate their reaction to decane vapour, a probable lung cancer biomarker.

METHODS

**The electronic nose : SAMBre Sensors**
- T2603 (Figaro®)
- 3630T, 1430T, 2530T, 8530T (Umwelt Sensor Technik®)
- MP901 (Winsen®)
- BME680 (Bosch®)

**Specifications**
- Temperature maintained at 45°C within chamber
- Flow constant at 200mL/min
- Moisture and temperature monitored

**Chamber's lid**
- Outlet holes and heater
- Volume 7.5mL
- 6 MOS sensors

**TESTING PROCEDURE**

- 79% N₂ + 21% O₂
- 50% RH air
- Humidifier
- TD-GC-MS
- Sorbent tube
- E-Nose
- Teflon FEP bag (L-L)(ppmv level decade)
- Teflon FEP sampling bag (ppm level decade)
- micro-injections of liquid VOCs (±1μ)
- Dilution factor

**SAMPLE ANALYSIS**

Each Sample is analysed by TDGCMs, which serves as the method of reference

**RESULTS**

- The two sensitive sensors show a response proportional to the amount of Decane in the sample. Their sensitivity is higher than other sensors previously reported in literature.

**Conductivity of sensors over time**

- Decane
- 350T
- 350M
- 8530T
- MP901

- Median conductivity of MP901 in relation to decane concentration

- Median conductivity of 8530T in relation to decane concentration

- The other sensors show no response, or a response linked to varying amount of moisture in the sample

**CONCLUSIONS**

- The response of the MP901 and 8530T is directly correlated to the sample concentration in n-decane, which is not the case for the other sensors.
- Replacing sensors by new sensors of the same model shows similar behaviour, with varying sensitivity.
- This is valuable for biomarker detection and calls for more testing using other alkanes and usually undetected biomarkers.

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