

swiss scientific initiative in health / security / environment systems







FNSNE

ETH

Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich

ACTIVE AREA [1.6 x 1.6 mm²]

fully

10.73

0.71

0.70

-0.72 占

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of

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Textiles With Integrated Gas Sensors

1st generation of devices: lithography process

fabrication of a large – area textile air – filter



flexible, plastic strip containing a humidity and a temperature

- **Substrate**: Kapton[®] E (50 µm)
- Electrodes: lift off metal (Cr/Au, 5/100 nm)
- **Dry foil lamination**: PerMX3050, 50 µm
- **Spray coating of sensing layer** (CAB ~ 10 µm thick)
- Sensor encapsulation:
 - **Dry adhesive layer**: ARclear[®] 8932



2nd generation of devices: inkjet printing

- **Substrate**: Kapton[®] E (50 µm)
- Electrodes: Ag inkjet printed (LP50 printing platform + Dimatix Spectra SE-128 print head) ~ 400 nm thick. Curing at 290 ° C for 30 minutes on a hotplate
- **Dry foil lamination**: PerMX3050, 50 µm
- **Inkjet printing of sensing layer** (CAB ~ 6 µm thick)
- Sensor encapsulation:
 - Dry adhesive layer: ARclear[®] 8932

Weaving process









can show the real –

time

acquisition of

Conclusions

We successfully realised a textile containing humidity and temperature sensors employing two different technologies: a clean room process and an all – inkjet printing fabrication process. The correct functioning of the textile was tested by means of a transportable demonstrator, equipped with its own read out circuit and realised within the project. This study paves the way for the fabrication of sensorised textiles able to perform complex gas sensing tasks.