



Proc. Eurosensors XXV, September 4-7, 2011, Athens, Greece

## Miniaturized surface ionization gas sensors

Angelika Hackner<sup>a\*</sup>, Sebastian Beer<sup>a</sup>, Gerhard Müller<sup>a</sup>  
Thomas Fischer<sup>b</sup>, Sanjay Mathur<sup>b</sup>

<sup>a</sup>EADS Innovation Works, D-81663 München, Germany

<sup>b</sup>Institute of Inorganic Chemistry, Universität zu Köln, D- Cologne, Germany

---

### Abstract

We report on novel kinds of miniaturized gas sensors whose operation is based on the principle of surface ionization (SI). In SI gas sensing adsorbed analyte species are ionized at a heated solid surface and the formed ions are extracted towards an oppositely charged collector electrode positioned at a short distance from the emitting surface. Here, we show that SI sensors allow for a fast, sensitive and selective detection of illicit drugs in the presence of large concentrations of solvent water.

© 2011 Published by Elsevier Ltd.

*Keywords:* gas sensor, surface ionisation, metal oxide, platinum, drugs

---

### 1. Introduction

Gas sensors are indispensable for the detection of hazardous, toxic and explosive substances. Other target substances of interest are illegal drugs and other controlled goods. All applications require high sensitivity, selectivity and speed of response. Miniaturized metal oxide (MOX) gas sensors do not usually exhibit the required degree of selectivity as the detection criterion of combustibility is shared by an extremely wide variety of target and background gases. Safety and security relevant gases are usually relatively reactive gases with low ionization energy. Less reactive background and interfering gases in comparison exhibit relatively high ionization energies. Ionization energy, therefore, is a much more useful detection criterion than combustibility. For this reason we have engaged in systematic research on SI processes on noble metal and metal oxide surfaces [1, 2].

---

\* Corresponding author. Tel.: +49-89-607-26450 ; fax: +49-89-607-26450 .  
E-mail address: [angelika.hackner@eads.net](mailto:angelika.hackner@eads.net) .