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Innovative sensor system and evaluation procedure for monitoring of food processing

There is a broad field of economic online and *in-situ* field analysis applications like the online monitoring of volatile components for quality monitoring in food processing. Looking to beer production, for example, the quality of the raw materials like grain, hops and yeast have to be investigated because these items could be the source of a contamination with *2,4,6-Trichloranisol* (TCA). TCA is a chloric aromatic hydrocarbon with intensive mildewed and moldy smell and, therefore, leads to immense damage of the product not only limited to beer production. Another field of application is the monitoring of food transport and store chains to guarantee the quality of food and to avoid harm for the consumers. Typically, Volatile Organic Compounds (VOCs) are often evaporated, which can be measured by sophisticated gas sensor systems and therefore used for investigations of the mentioned problems. The purpose of this paper is to introduce a sophisticated sensor system which was developed to measure VOCs. The principal sensing element is a four-fold sensor array on a 4x4 mm^2 alumina chip (Figure 1), which comprises four micro-dispensed thick-film sensing layers of different SnO_2/additive-composites. Operating MOG sensors thermo-cyclically and simultaneous sampling of the conductance yields gas specific Conductance-over-Time-Profile (CTP) features. Further-more, an innovative calibration and evaluation procedure ProSens will be introduced, which enables substance identification and concentration determination even in the case of varying environmental conditions from the characteristic CTP shapes. Many field analysis problems like those mentioned above are looking for innovative solutions. The above described sensor chip in combination with the numerical procedure ProSens is a powerful tool to solve existing problems in the area of food monitoring and food processing.

Figure 1: Multi-sensor-array with four different layers dispensed on thin-film Inter-Digital-Electrodes. The chip is mounted on TO 8 headers.

Biography

Rolf Seifert received his Dipl.-Math from the University Freiburg, Germany in 1985. Since 1986 he works as a scientist at the Karlsruhe Institute of Technology (formerly Nuclear Research Center Karlsruhe and Research Center Karlsruhe). Under the German Support Program, he was involved in the designing of a statistical evaluation tool called PROSA which is used for NRTA in the Agency. He is now working in the field of sensor technology, especially on mathematical classification and evaluation procedures for sensor signals from multi-gas sensor systems. He is member of the technical committee "Multi Gas Sensors" of the association of German engineers (VDI) and Lecturer in Mathematics, Logic and Algebra at the Technical University Karlsruhe and at the Baden-Württemberg Cooperative State University Karlsruhe.

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