

Transforming the invisible

– an innovative approach for gas sensing technology



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The Horizon Europe project „AMUSENS“ will demonstrate a new development method for low-power metal oxide (MO) gas sensors with adaptable selectivity to different gas environments, combining it with artificial intelligence (AI)-assisted sensor data analysis to improve the applicability of gas sensors in commercial settings and day-to-day life.

Gas sensors are crucial in personal and industrial monitoring to analyse personal exposure to air pollutants or to critical gases, to control product quality, such as in the food industry, and in health care. These applications require miniaturized, low power and low-cost gas sensors with good gas selectivity to be integrated into personal devices such as a badge or a watch. AMUSENS will have a direct economic impact on the highly active segment of gas sensors for the consumer market, and a direct scientific impact on high-level research in the field of gas sensors and artificial intelligence (AI).

Examination of the current situation

At this point of time, there is a lack of products available on the market that meet the requirements for commercial use. Systems based on optical spectroscopy usually require bulky and expensive technologies or are too specific, making them poorly compatible with the current needs of portable electronics and appliances markets. Available systems and approaches suffer from low selectivity, responding to many gases without discrimination. Moreover, at this stage commercial MO sensors are manufactured in batch, which is creating a barrier for new sensor materials to go into production, as every new entry requires process changes and suitable market size.

AMUSENS aims to develop a gas sensor platform with flexible selectivity to different gas environments by combining a multi-pixel approach and artificial intelligence to adapt the data analysis to the targeted applications, such as fields of personal environmental monitoring and health care. It is based on MO sensing materials on micro-hotplate platform, which are already available on the market for low power applications but suffer from a lack of selectivity. Additionally, AMUSENS plans to establish to design a new production method for MO gas sensing that allows to easily adapt sensing materials.

Key elements and objectives of the project will be:

- to design and develop specific gas sensing using metal oxide nanostructures.
- to develop material and selectivity using specific AI.
- to use a combinatorial approach to multi-pixel sensors through innovative production methods based on additive manufacturing technologies.

The AMUSENS consortium is driven by the goal of demonstrating a new approach for the realization of a low-cost and low power multi-pixel sensor platform with adaptable response to various gas environments. It consists of ten partners – including a highly qualified industry partner (Sciosense Germany GmbH), four high research ranked academic partners (Luxembourg Institute of Science and Technology, University of Liège, Università degli studi di Brescia and Institut Mines-Telecom) and five experienced SME (Technikon Forschungs- und Planungsgesellschaft mbH, Atlant 3D Nanosystems Aps, JLM Innovation GmbH, Ellona SAS and Science for Change, SL). With our strong team of industrial, academic and research partners we are convinced that AMUSENS will have a direct economic impact on the highly active segment of gas sensors for the consumer market on the one hand, and a direct scientific impact on high-level research in the field of gas sensors and artificial intelligence (AI) on the other hand.

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For more information about the AMUSENS project, visit our website or contact the project coordinator:

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