

European scientists team up to develop tomorrow's hydrocarbon sensing systems

In a collaborative effort scientists and engineers from all across Europe join forces in the recently launched EU project "Photonic sensing of hydrocarbons based on innovative mid infrared lasers" (SENSHY) to develop a new generation of laser based gas sensing systems for hydrocarbons.

The market for gas sensors is of global significance and is rapidly expanding, fuelled by new applications based on ever-growing public concerns over such issues as pollution, health and safety at work, as well as new developments in industrial process control. A key area with particular potential to increase this market further is Tuneable Diode Laser Spectroscopy (TDLS), a laser based approach which is now seeing increased commercial exploitation and is positioned at the very centre of the SENSHY project.

Using TDLS, a variety of gas species can be detected at trace levels in the ppm or even ppb range. The key components of modern TDLS systems are tuneable semiconductor lasers, which allow the system to be miniaturized and allow highly sensitive quantitative measurements with fast response time without the need for recalibration. Sale of TDLS based instruments is currently rapidly expanding with typical growth rates of 30% for the last few years.

Presently however, application grade semiconductor lasers are not commercially available in the wavelength range around 3.3 μ m. The SENSHY project will overcome this obstacle currently hindering a widespread exploitation of laser based gas sensing in this wavelength range, which is particularly important for the detection of hydrocarbons.

Challenging applications with significant market potential are investigated within the SENSHY project. Industrial partner *Gas Measurement Instruments LTD* – one of the major suppliers of gas detection equipment to the gas distribution industry worldwide – will investigate applications in methane sensing. Detecting methane gas is one of the most important and widest ranging of chemical measurements with particular relevance to safety monitoring in environmental applications such as water treatment plants and landfill sites as well as in energy exploration, transmission and recovery. Industrial partner *Siemens Laser Analytics AB* will address applications of laser based sensing in process control systems for the aliphatic hydrocarbons propene and propane. Efficient control of process parameters will enable increased energy efficiency, improved product quality and pollutant reduction.

Recently, a contract was signed between the European Community and coordinator *nanoplus Nanosystems and Technologies GmbH*, a company specializing in high performance semiconductor laser sources for sensing applications. The SENSHY project with partners from the United Kingdom, France, Poland, Sweden and Germany has a duration of three years and is supported by 2.35 million euro funding from the European Commission as part of the EU 7th Framework Programme. In order to achieve the challenging scientific and technological objectives of the project, the consortium comprises renowned academic and industrial partners across Europe. Their range of complementary competencies combines all aspects of semiconductor material growth, characterization, and laser processing with state-of-the-art know-how of leading gas sensing companies.

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