Nicolas Javahiraly
University of Strasbourg, France
Session Chair

Review on the progress of nano-sensors for hydrogen leaks – nanostructured sensors based on palladium nanoparticles

Hydrogen seems to be one of the alternative ecological sources of energy related to numerous industries. It is presented as the sustainable energy carrier of the future. Hydrogen may be used to produce, store and transport energy and its possible applications are wide ranging. The industry based on the use of gaseous hydrogen has to meet the safety standards connected to the physical and chemical properties of hydrogen and to its operating conditions (pressure and temperature range). Hydrogen is a flammable and highly explosive gas: the lower flammability point is 4% in air going up to an upper limit of 74.5% and the ignition energy in air is as low as 0.02 mJ. The present hydrogen detectors use electrical sensors that may be subject to short-circuits and produce sparks. In order to eliminate this risk, for example, optical sensors appear as a sensible alternative for hydrogen detection. They exhibit sensitivity and response time equivalent to electrical devices without involving hazardous conducting parts. Moreover, they are intrinsically insensitive to electromagnetic perturbations. This review is devoted to describing the recent progress in the innovative nano-sensors for hydrogen leak detection exploiting the properties of Palladium nanoparticles or nanostructured designs to bring a real breakthrough into detection performances.

Keywords: Hydrogen, sensors, review.

Biography

Nicolas Javahiraly is an associate professor in physics at the University of Strasbourg. He did his PhD in Photonics at the same university on fiber optic sensors. After a post-doc at Harvard University on the interaction between ultra-short laser pulses and matter, he worked as a project manager and expert in the Sagem Defense group in Paris. He joined the University of Strasbourg in 2007 and is currently working on nano-optical sensors and plasmonics for various applications such as gas detection, pollutants detection and photoconversion systems for example.

KEYNOTE SPEAKER