

MINIATURE SPECTROSCOPIC SENSORS FOR IN-SITU, HIGH-SENSITIVITY CHEMICAL ANALYSES

Innovations and benefits - ENEA is endowed with miniature SERS and LPAS spectroscopic sensors, which allow to perform in-situ, high-sensitivity chemical analyses, with no need of sampling and with immediate, on-line response on trace samples. Both sensors make it possible to perform analyses on tiny sample amounts, laser-evaporated in the photoacoustic cell in one case, and deposited on micro-structured substrate and then studied at the microscope in the other. The recognition occurs based on the presence of functional groups detected through the typical vibration frequencies (infrared photoacoustic spectroscopy, surface Raman spectroscopy).

Uses - Trace, solid or liquid dangerous (explosives, bacteria) or harmful (methanol, etc.) substance detection for security and preventing food adulteration and drug counterfeiting.

Past and present activities - As to security, activities are underway in collaboration with Consorzio Creo of Finmeccanica Group, within the framework of EU BONAS and RAMBO projects. In the sector of food anti-adulteration (SAL@CQO project of Industria 2015), applications are in progress on extra virgin olive oil (olive oils of minor quality, vegetable oils), milk (melamine) and wines (methanol). Creation of reference databases for a number of substances. Development of neural-network software for queries and automated analysis.

