Optical Chemical and Biochemical Sensors: New Trends

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Chemical and biochemical sensing is under the extensive research all over the world and many chemical and biochemical sensors are finding increasing number of applications in industry, environmental monitoring, medicine, biomedicine and chemical analysis. This is evidenced by each-year-growing number of international scientific conferences, in which advances in the field of the sensors are reported. One of the main reason why only a few sensors reaches the international market, notwithstanding the high number laboratory prototype described in many peer reviewed papers, lies in the fact that a biochemical sensor is a highly interdisciplinary "object" the realization of which requires the team work of scientists coming from different areas such as chemistry, physics, optoelectronics, engineering, biochemistry, and medicine. And this peculiarity is not easily found in the research teams.

Health-care is surely the application field which seems to have the best future development perspectives, not only considering invasive applications (the high degree of miniaturisation of optical fibre sensors, their considerable geometrical versatility, and extreme handiness make it possible to perform a continuous monitoring of numerous parameters, thus enabling performances which are often unique) but also taking into account the development of optical multiarray biochips for the analysis of multiple parameters, essential in view of an immediate rapid screening of the patient pathology. But optical chemical and biochemical biosensors can play a fundamental role also in environmental applications and in the area of food packaging.

The fundamental basis of chemical and biochemical optical sensing are summarised and the new trends are described.