

**Call for application for research scholarships
for post-graduate international candidates**

RESEARCH PROJECT N. 39

Title
Development of a gas sensor array for environmental monitoring able to work at room or near room temperature
Scientific responsible (name, surname, role)
Jean-Marc Tulliani, Associate Professor (jeanmarc.tulliani@polito.it)
Short description of the research activity (max 250 words)
<p>The objective of this project is the development of nanomaterials with hierarchical architectures for the realization of a gas sensor array capable of detecting NO_x, O₃ and NH₃ in air at low temperature.</p> <p>Air pollutants monitoring is currently a “key issue” in the management of urban areas due to its direct implication in the preservation of human’s health and the environment.</p> <p>NO_x gases (NO, NO₂) are usually produced from combustion of hydrocarbons in air, such as occur in car engines. Moreover, NO_x emissions can be catalyzed by the summer sun, resulting in ozone alerts. Thus, it is necessary to develop highly sensitive and inexpensive gas sensors to detect low concentrations of these pollutants.</p> <p>Ammonia is another toxic gas found in chemical industries and fertilizers environmental. Besides, ammonia is an important indicator of many foods’ freshness such as, for example, milk, meats, cheeses and fishes.</p> <p>A wide range of sensing technologies have been employed to determine pollutants concentration in air. Among them, gas-sensitive semiconductors evidence enormous potential, compared with traditional measurements methods, because of their low cost, ease of operation, high long-term stability, moderate power dissipation and high reliability.</p> <p>The development of better efficient gas sensors can take advantage from nanotechnologies, in the bottom-up development of new materials. A quite novel approach is based on hierarchical structures and nanostructures having a microstructure with relatively large pores and walls decorated with nanostructured objects. The rapid and effective gas diffusion toward the entire sensing surfaces is facilitated by the microporous structure.</p>
Specific requirements (experiences, skills)
Materials science, Chemistry, Gas sensing, Catalysis.
Website of the research group (if any)
Research activities are illustrated here: https://www.researchgate.net/profile/Jean-Marc_Tulliani
Keywords (min 3, max 6)
Environmental monitoring, gas sensors, semiconducting metal oxide, sensor array, low working temperature.
Research Area (max 1)
Chemistry and Material Science