Sensors for monitoring the quality of the living environment

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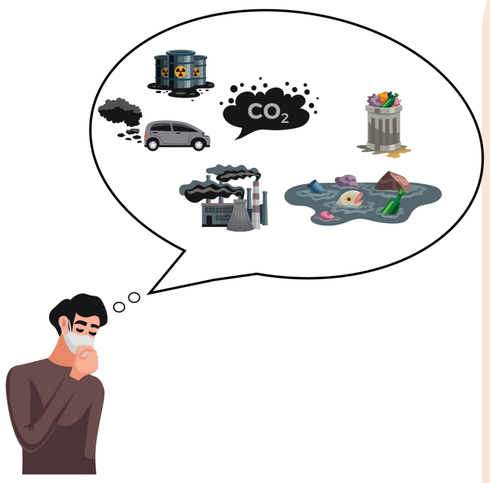

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Pollution is not only due to external sources such as industrial toxic emissions, smog, traffic and so on. In reality, we are surrounded by pollutants even in the places where we think are safe as at home. Indeed, the air we breathe in our homes, offices, school can be unhealthy. This is called "**indoor pollution**"; it can be quantified through the Indoor Air Quality (IAQ) index.
The consequences related to poor domestic air quality are connected a higher incidence of pneumonia, acute chronic respiratory infections, heart attacks, cardiovascular diseases and respiratory allergic diseases, found especially among the most sensitive population such as the elderly.

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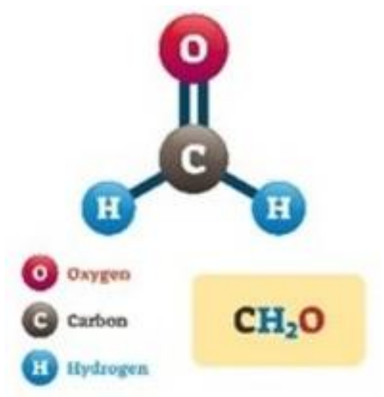
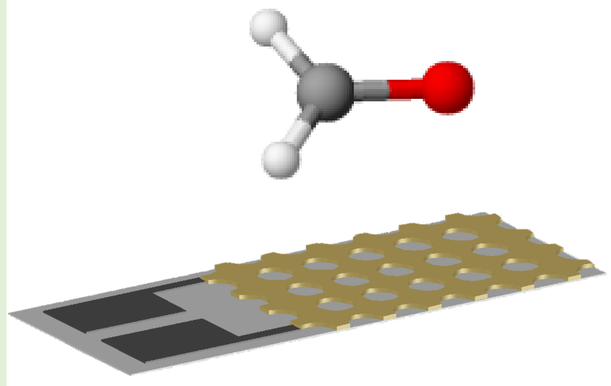


Indoor pollutants that worsen air quality are coming from painted walls, from furniture and from detergents used for cleaning the house, and so on. Among the indoor chemical pollutants, **formaldehyde** is one of the most toxic Volatile Organic Compound (VOC). The international agency for cancer research (IARC) classifies formaldehyde as a carcinogen. In our homes formaldehyde is present in low concentrations, however we must be careful because mainly accumulates in conditions of low temperature and low humidity.

Concentration Formaldehyde	Symptoms
0,5-2 ppm	Ocular irritation
beoyd 5ppm	lower airways
above 50 ppm	pneumonia, pulmonary edema and death

The WHO Guideline for Indoor Air Quality for formaldehyde (WHO, 2010) sets an exposure limit to ***81 ppb*** (30-minute average concentration). The WHO guideline value is considered protective against both acute and chronic sensory irritation in the airways in the general population and in potential sensitive subpopulations including children and the elderly.

Our research group at **the University of Messina**, is actively involved in a project **(4FRAILTY**) for developing an intelligent indoor formaldehyde sensor. The **objective** of this research project is to develop a conductometric device based on metal oxides of reduced dimensions which is not only sensitive and selective, but which is able to process and communicate the acquired data. The technological innovation of the sensor will be also its miniaturization and networking capacity. The sensor developed will be then simple and reproducible by the industries of the microelectronics sector, useful for the monitoring of indoors in order to protect people's health and in particular to protect the most fragile people such as the elderly and children who spend more time at home.



Acknowledgments

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