Sensors and biosensors based on organic semiconductors

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Nowadays, diagnosis and continuous monitoring of physical, biochemical and chemical variables are of major interest because their possible changes or disruptions may cause adverse effects or even death. Among them, organic and inorganic chemicals control became of crucial importance due to their ubiquity in a wide variety of medical, agricultural and industrial applications. While the wide use of such chemicals has had significant economic and social benefits it has also led to the release of many micro-pollutants into the environment that are harmful even at very low concentration. Therefore, an increased effort in fast and selective detection methods allowing real-time monitoring of their concentration changes is strongly necessary. For instance, chromatography techniques (high performance liquid chromatography (HPLC), liquid chromatography coupled with spectroscopy (LC-MS), gas chromatography (GC), capillary electrophoresis (CE) etc…) are methods extensively used for the determination of various chemicals disruptors. Although, these methods offer excellent selectivity and detection limits, they are not suitable for rapid processing of multiple samples and real-time detection. They involve highly trained operators, time-consuming detection processes, and complex pre-treatment steps requiring efficient low-cost alternatives.

These concerns have lead to the development of emerging techniques with highly specific features. Thus, the design and fabrication of electrochemical and field effect transistors based sensors are both promising approaches for the future in diagnosis and monitoring. They fulfill the requirements in terms of selectivity, sensitivity, fabrication cost and size, as well as, in term of easiness of use.

In this context, we will present herein the preparation and the sensing properties of highly selective and specific sensors based on organic semiconductors [1].

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Publications