

## **DEVELOPMENT, CHARACTERIZATION AND APPLICATION OF ADSORBENT MATERIALS FOR WATER DECONTAMINATION AND RECOVERY OF SECONDARY RAW MATERIALS**

This research topic has the ultimate aim of studying nano- and meso-porous materials with respect to their characteristics as adsorbents towards different organic pollutants in waters (emerging and persistent organic contaminants). Additionally, this project can give impulse to develop new materials for liquid chromatographic applications and/or solid-phase extraction (on-line, too) and pre-concentration steps in environmental, pharmaceutical and food chemistry.

### *GOALS*

Interaction mechanisms between organic molecules and chiral or achiral stationary phase are studied and investigated. Specific separation issues are solved through the development and characterization of new adsorbent materials. These will be employed in analytical applications for separation, extraction and/or pre-concentration. These studies can have remarkable fallouts in different research area, such as environmental chemistry or agri-food. Innovative decontamination techniques will be developed in order to treat waters and recover secondary raw materials from waste waters.

### *INSTRUMENTS AND METHODS*

Research goals are reached by using instrumental techniques such as liquid chromatography (HPLC), gas chromatography (GC), capillary electrophoresis (CE), atomic emission and absorption spectroscopy (AES and AAS), field flow fractionation (FFF). Advanced equipment are already present within the research group laboratories and they couple separation techniques and mass spectrometric detection (HPLC-MS, GC-MS, ICP-MS). Moreover, sample treatment approaches are used, such as solid-phase extraction (SPE) and solid-phase micro extraction (SPME).

### *MAIN SUBJECTS*

Separation Science; Environmental Analytical Chemistry; Food Chemistry; Organic Chemistry.

### *RESEARCH GROUP*

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### *COLLABORATIONS*

The research group has many active collaborations inside the Department and the entire University of Ferrara (Physic and Earth Sciences Department). Also, national (Eastern Piedmont University) and international (A. Galarneau, Istitute Montpellier, France) collaborations can be counted.