

SEPARATION SCIENCE

Fundamental investigations in separation sciences are nowadays made in chemical and biological sciences as well as different topics of engineering. Separation sciences involve understanding of processes and materials interaction with solutes for chromatographic separation and analysis of specific molecules. Analytical determination occurs usually from complex matrices, such as environmental, food, biological, pharmaceutical or industrial.

GOALS

The ultimate goal is to study fundamental aspects of physico-chemical phenomena, both from experimental and theoretical viewpoints, and understand how they rule separation processes (i.e., adsorption processes onto micro- and nano-porous materials, molecular and chiral recognition processes, effects due to surface heterogeneity, mass transfer phenomena in porous media, etc. This knowledge is fundamental also to improve technologically the employed adsorbent media, optimization of efficient, selective, sustainable analytical methods (i.e., determination of chiral compounds, emerging contaminants, nanoparticles, biologically active compounds, rare earth, etc.). Finally, all this can be pivotal for implementation of advanced separation systems (i.e., multidimensionally hyphenated, bioreactors on-flow, etc.).

INSTRUMENTS AND METHODS

Laboratories of Separation Science Research Group at the University of Ferrara are well equipped with modern, advanced instrumentation, such as liquid chromatographs (standard and micro systems) for HPLC and UHPLC analysis, LC-MS (linear ion trap analyzer), LC-ICP/MS (triple quadrupole analyzer), GC-MS (both single quadrupole and ion trap analyzers), CE (both UV-Vis and fluorescence detectors), Field Flow Fractionation.

MAIN SUBJECTS

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

RESEARCH GROUP

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COLLABORATIONS

Research activities has active collaborations with other Departments of the University of Ferrara (i.e., Physics and Earth Science), numerous national (i.e., Eastern Piedmont University, University of Rome "La Sapienza") and international (A. Galarneau, Istitute Montpellier, France; A. Felinger, University of Pécs, Hungary; G. Desmet, University of Brussels, Belgium; N. Delunay Paristech, Colloïdes et Sciences Analytiques, Paris, France) scientific partnerships.