

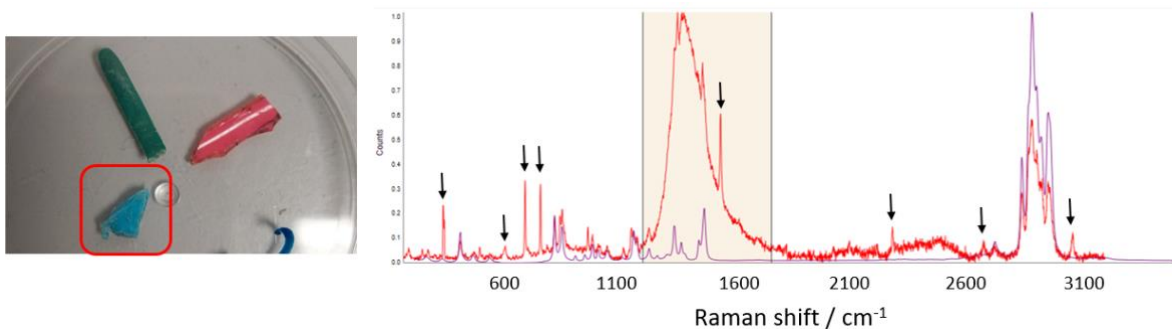
Physical Chemistry of plastics pollution: detection and analysis of micro- and nano-plastics, degradation mechanisms, interaction with environment and life

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Plastics particles can be found in water (sea and rivers), in soils and in the air and this environmental problematic has led to consider plastic as an emerging pollutant. The resulting products of plastic degradation are going from microparticles (size lower than 5 mm) to nanoparticles (size lower than 1 micrometer) and can extend to potentially volatile and soluble molecules.

Many studies about this emerging pollution have been reported in the fields of environment, ecology and more specifically eco-toxicity. They have shown that plastic pollution can be found everywhere in the environment and has a real impact on ecosystems and living organisms. Nonetheless, the still too rare contribution of physico-chemists, specialists of polymers, could help answering key questions:

- Due to their diversity in size and composition, the identification and characterization of micro-, and even more, nano-plastics in the environment remains challenging and requires specific analytical tools. Their sensitivity, both regarding detection and spatial resolution, will be discussed during this session.



Raman spectrum of a plastic found on a beach of Var (France). The polymer itself is easily identified but some other unidentified modes are also observed.

- The degradation mechanisms of a polymer and the generation of micro- and nano-plastics must be more deeply understood and modeled, in particular the influence of key parameters (composition, micro-structure, optical and mechanical properties...)
- The interactions between micro- and nano-plastics and their living environment are not fully understood: aggregation, colonization by microorganisms, enzymatic degradation....
- What are the role of other pollutants than the polymer itself? Additives role, absorption or emission of molecules...

The objective of this session is to present a state of the art on those important questions where interdisciplinarity between condensed matter physics and other scientific fields is highly relevant.