Micro-Raman spectroscopy for identification of microplastics in the São Vicente estuarine

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Highlights

Micro-Raman was used to characterize polluting microplastics from the sea environment

Abstract

Microplastics (MPs) are a concern regarding our environment due to the risks posed by the interactions of the large amounts of anthropogenic MPs dumped in the environment with biological systems. MPs have been vastly found in the environment and are transferred to the food chain with MPs being detected in foods, beverages and even in human blood and breastmilk. Understanding the behavior and characteristics of MPs is critical to assessing potential health risks (human and environmental) related to MPs and taking steps to prevent them from entering the ecosystem. Micro Raman spectroscopy is a powerful tool for measuring and characterizing MPs particles, being considered the gold standard because it allows identification of both the polymer matrix and possible pigments and contaminants. Furthermore it offers the possibility of characterizing both the chemical structure as well as the morphological features of the MPs. We utilized a Raman system to characterize MPs from the environment. Results from a standard MP sample were successfully measured and identified to reference spectra and even small portions of the sample as small as a few µm are suitable for obtaining a high quality spectrum for identification of the material (Fig1). Samples collected from at the São Vicente estuarine are being studied and by means of comparison with the *Willey* database it was possible to identify MP, additives and contaminants, thus demonstrating the power of the technique.
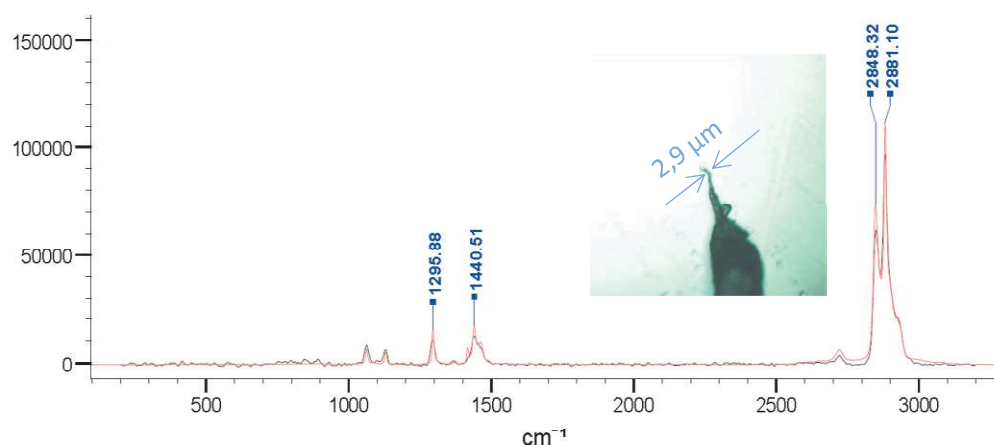

Figure 1: Raman spectra of a low density polyethylene microplastic compared to reference spectra. Measured spectrum (black line) and reference spectrum (orange line). Inset: sample picture indicating the measured region.

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