

Impact Of The Polymer Degradation On The Metallic Additives Distribution In Microplastics

IMANE KHATIB¹, CHARLOTTE CATROUILLET²,
DELPHINE VANTELON³, CAMILLE RIVARD⁴, MELANIE
DAVRANCHE⁵ AND JULIEN GIGAULT⁶

¹Geosciences Rennes

²Université Paris Cité-IPGP CNRS UMR7154

³SOLEIL synchrotron

⁴INRAE TRANSFORM

⁵Université de Rennes, Géosciences Rennes, UMR-CNRS 6118

⁶University of Laval

Presenting Author: imane.khatib@univ-rennes1.fr

The increasing production of plastics combined with the mismanagement of the plastic waste contributes to the creation of an environmental and health threat at a planetary scale. In addition to the alteration of plastic waste, the release of their additives and their fate remains unexplored. Although many studies focused on organic additives such as endocrine disruptors, few information is available on inorganic additives, especially on metals. These metallic additives can be released into the environment by degradation of the polymer matrices, becoming a new source of toxicity.

To assess the impact of plastic degradation on the metallic additives' distribution and release, altered macroplastics (> 5 mm) were collected in the environment. By micro-XRF performed on a synchrotron line, colocalizations of metals were observed in the altered and unaltered layers of plastics. In the polyethylene plastics, metal additives are distributed as hotspot and large area as well as diffused elements. Statistical study analysis of the ratios between metals present in the non-altered and altered layers showed a preferential release of some metals. For a given additive some metals are released in greater quantity than the other. Plastics are therefore not only vectors, but also sources of metals in the environment.