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## Using Synchrotron Microscopy and Spectroscopy to Examine the Effect of Environmental Systems Conditions on Plastic Degradation Pathway

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Plastics such as low-density polyethylene (LDPE) are among the most widespread and persistent pollutants globally, necessitating a detailed, process-level understanding of their behavior in the environment. Generation of plastic waste has grown exponentially since the 1960s resulting in approximately 320 million tons of plastic produced per year.<sup>1</sup> While numerous studies have quantified microplastic abundance and examined individual mechanisms of microplastic degradation, particularly in laboratory settings, relatively few have examined the effect of environmental systems conditions on plastic degradation pathways.<sup>2</sup> We will present results from a two-year long field campaign examining the effect of key environmental parameters on the degradation of commercially available LDPE. Changes in LDPE surface chemistry were examined via FTIR, X-ray fluorescence microscopy, 3D XANES, and Fe K-edge HERFD-XANES. The sorption of mercury to aged plastics was analyzed via Hg L3-edge HERFD-XANES.

### References

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