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Rapid non-invasive portable system for monitoring deterioration of plastics

A system comprising a portable device and image processing software for superficial non-destructive determination of plastic deterioration

Technology No. 2022-298

IP Status: Provisional Patent Application Filed

Applications

- Characterization of plastics
- Predictive maintenance of plastic components
- Plastic recycling

Technology Overview

Researchers at the University of Minnesota have developed a system comprising a portable device and image-processing software to monitor deterioration of plastics. This rapid non-invasive portable system is a potentially cost-effective, reproducible, and nondestructive approach for monitoring deterioration of polyethylene and polypropylene materials using Nile Red as a fluorescent probe. Fluorescence spectra shifts correlate with chemical and physical changes to the plastics and are dependent on polymer type but independent of the polymer film thickness. The image-processing software correlates the fluorescence spectra shifts with a carbonyl index, which is used to characterize the plastics. This technology has several applications, including predictive maintenance of plastic components and plastic sorting to improve recycling.

Phase of Development

TRL: 3-4
A proof-of-concept prototype has taken preliminary images demonstrating the functionality of the system.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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Researchers

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