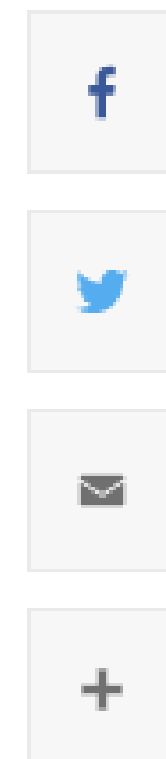


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Scientists enhance recyclability of waste plastic

March 15, 2023



Plastics are incredible materials with properties invaluable to the functioning of our modern world. They are strong, flexible, versatile, long-lasting and inexpensive. In particular, high-density polyethylene (HDPE) is ubiquitous in single-use applications such as packaging and containers, labeled with the number two inside the triangular recycling symbol.

But the ways HDPE is produced and current methods for recycling it pose threats to human health and that of our planet. Many HDPE products are made from fossil fuels (crude oil, natural gas or coal) and have a massive carbon footprint. And rather than being reused or recycled, most waste HDPE is incinerated, dumped in landfills or left littering the environment. When it is recycled, the quality of the material degrades.

Cornell scientists working with the U.S. Department of Energy's (DOE) Institute for Cooperative Upcycling of Plastics (iCOUP) have developed a new method for recycling HDPE. Using a novel catalytic approach, the researchers transformed waste HDPE plastic into a new material that can be recycled repeatedly without loss of quality. The team's new approach converts used HDPE into a fully recyclable and potentially biodegradable material with the same mechanical and thermal properties of the starting single-use plastic. If adopted widely, approaches like this could eventually help to reduce the carbon emission and pollution associated with HDPE.

"We are using waste plastic as our source instead of fossil fuels. Instead of drilling for oil and polluting the environment, we're using stuff that would otherwise be incinerated or left in a landfill," said [Geoffrey Coates](#), Tisch University Professor in the Department of Chemistry and Chemical Biology in the College of Arts and Sciences.

A [paper on the results](#) was published in the Journal of the American Chemical Society.

[Read the full story on the College of Arts and Sciences website.](#)

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