

# UW-Madison: New approach for breaking plastics down shows promise for upcycling them

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MADISON – Many of us fastidiously clean and sort our yogurt containers, milk jugs and mountains of other plastic waste each week, getting that packaging ready for the recycling bin. But of the billions of tons of plastics produced between 1950 and 2015, only 9 percent was actually recycled, according to a 2018 study.

“We don’t have the technology to really recycle plastic,” says George Huber, a University of Wisconsin-Madison professor of chemical and biological engineering. “Thirty percent of our plastic is ending up in the environment. The current plastic infrastructure is not sustainable right now.”

Huber hopes to close the loop on plastics recycling through a new research venture that leverages his expertise in biofuels. For the last 15 years, he has focused primarily on biomass, leading efforts to turn wood wastes and other sources of plant biomass into sustainable liquid fuels. Much of that research involves pyrolysis, or heating up the biomass in a low-oxygen environment in the presence of a catalyst.

Motivated by reports of all of the plastics polluting our oceans in recent years, Huber began wondering if pyrolysis could help in recycling plastics, as well. Plastic materials are difficult to recycle because of the wide variety of plastic types and the various pigments and additives mixed in with them. Most recycled plastic is mechanically ground up and “downcycled” into lower quality, nonrecyclable products like carpet fiber or polyester thread. Pyrolysis, however, can break the plastic down into chemical “feedstocks,” which could then be recycled (upcycled) into fuel or even used to create new virgin plastic, a process that could be repeated dozens or even hundreds of times.

“We started thinking about whether we could pyrolyze those plastics and what we could make if we did that,” Huber says. “We literally took our reactor, where we were pyrolyzing biomass, and instead of adding wood into the feed, we added plastic and made a liquid oil. And then we analyzed the chemistry.”

STORY CONTINUES AT <https://news.wisc.edu/new-approach-for-breaking-plastics--down-shows-promise-for-upcycling-them/>