A Better Bottle
Using crop leftovers to make plastic without a carbon footprint.

Recycling a plastic bottle may provide a fleeting sense of green philanthropy, but the process of making that bottle is still pretty eco-unfriendly. Now, chemists at Stanford University have developed a new plastic-making method that could leave no carbon footprint.

Most of the 270 billion plastic bottles used in the U.S. each year are derived from petroleum. And that manufacturing contributes to a global greenhouse gas hit of more than 200 million tons of carbon dioxide each year — the same amount about 150 coal power plants generate annually. Some plastics companies are attempting to cut that footprint by substituting corn-based sugar for petroleum. But planting, fertilizing and harvesting corn generates significant carbon emissions, too, says researcher Matt Kanan.

Instead of sugar, Kanan’s team developed a process that uses carbon dioxide and furfural, a compound derived from corn harvest waste. First, they converted furfural into furoic acid, a common food preservative. Next, they had to break the furoic acid’s strong hydrogen-carbon bond. Normally this requires an expensive base (the chemical opposite of an acid) that’s reactive and unstable — considerable hurdles to eco-friendly mass production. But the team discovered a workaround by heating the acid to 390 degrees Fahrenheit. At that temperature, carbonate (a weak, non-hazardous base) can break the hydrogen-carbon bond. So when they mixed the hot furoic acid, carbonate and CO₂, the result was a compound that could be turned into plastic.

Another plus? This technique, published in the journal Nature, not only uses existing plant waste but consumes large amounts of CO₂ and could be applied to other types of chemical manufacturing as well — a boon to our increasingly CO₂-saturated atmosphere. — HEATHER STRINGER

Denver Coliseum Mineral & Fossil Show

America's Largest Show September 10 – 18, 2016

3 Miles of Tables | 30,000 Visitors | 33 Acres | 300 Booths & Tent Spaces

Come browse beginner and investment grade mineral specimens, fossils, complete dinosaurs, meteorites, gemstones, artisan jewelry, crystals, gold, silver, turquoise, amber, petrified wood, interior decor, historical items, instruments, and so much more! Items priced from $1 to $1 million. This is where museums come to shop and science stores buy their inventory. Families are warmly welcomed. Allow 3 – 6 hours to see it all. Free Parking and Free Entry!

www.ColiseumShow.com
Discover Article Response

Complete these questions with well thought out responses on a separate piece of paper. It must be complete and legible. If your penmanship is poor, consider typing your responses.

1. Article Title: ____________________________________________

2. Article Date: ____________________________________________

3. Identify the book chapter _____, section _____ and page(s) _____ that relates with this reading.

4. In 1-2 sentence(s), provide your rationale as to why the article relates to the text.

5. In one, well-developed paragraph, provide an accurate summary of the text.

6. Identify three key science specific terms in the article and provide a definition for the terms.

7. Think about and identify at least one science career(s) required to perform the work/experiments in the article. Describe your level of interest in this career/subject and why you would or would not like to pursue these topics further.

8. Propose an additional problem or question for scientific investigation that relates to this article.