

Going 'green' with plant-based resins

August 16 2017

Airplanes, electronics and solar cells are all in demand, but the materials holding these items together—epoxy thermosets—are not environmentally friendly. Now, a group reports in ACS' journal *Macromolecules* that they have created a plant-based thermoset that could make devices "greener."

Thermosets are resins that, when cured, undergo a change that makes them strong and stable. Once thermosets are molded into a shape, they typically are set and cannot be reworked. These materials are frequently used as adhesives and coatings in electronics, appliances and aircraft. But most epoxy thermosets are made with nonrenewable materials, and some contain substances that can potentially harm the environment. And because of their structures, they cannot break down or be recycled. Plant-based thermosets are commercially available but they are usually weak and easily break. Jian-Bing Zeng and colleagues wanted to create a safe and strong plant-based thermoset.

The team developed a new curing agent that was made of components of [castor oil](#), which is derived from a plant. When the researchers used the agent on a soybean-based epoxy thermoset—also derived from a plant—it became more crystalline. That made the material stronger, and more durable and heat-resistant than before. In addition, light passed through the soybean-based thermoset, potentially making it ideal for applications, such as for use in [solar cells](#).

More information: Xin-Yi Jian et al. All Plant Oil Derived Epoxy Thermosets with Excellent Comprehensive Properties, *Macromolecules*

(2017). [DOI: 10.1021/acs.macromol.7b01068](https://doi.org/10.1021/acs.macromol.7b01068)

Provided by American Chemical Society

Citation: Going 'green' with plant-based resins (2017, August 16) retrieved 18 April 2024 from <https://phys.org/news/2017-08-green-plant-based-resins.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.