



PURDUE
INNOVATES

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Carbon-Fixing Cement

A carbon negative cement that slashes shrinkage, prevents corrosion, and eliminates calcination by using bio derived oxalic acid from agricultural waste.

Researchers at Purdue University have developed an acid-base cement formulation that has a carbon-negative impact, removing more carbon from the atmosphere compared to what's emitted during manufacturing and transport. The synthesis of oxalic acid from existing carbon dioxide has traditionally been impeded by high energy costs and severe pollution, but Purdue researchers have developed a method to circumvent these barriers by converting lignocellulosic materials to fermentable sugars, which increases the strength of the cement and affects hydration. This technique also prevents corrosion in the long-term, providing a viable eco-friendly alternative to current concrete/construction systems.

Technology Validation:

The researchers successfully produced oxalic acid from corn stover.

Advantages:

- 10 times reduction in shrinkage
- Highly tailorable strength
- Protection from corrosion
- Calcination-free

Applications:

- Construction

TRL: 3

Intellectual Property:

Provisional-Patent, 2023-07-24, United States

PCT-Gov. Funding, 2024-07-23, United States

NATL-Patent, 2026-01-23, United States

Technology ID

2023-LADI-69960

Category

- Chemicals & Advanced
- Materials/Coatings, Adhesives & Sealants
- GreenTech/Circular Economy & Waste Reduction
- Chemicals & Advanced
- Materials/Materials Processing & Manufacturing Technologies

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