

Biomimetic Adhesives Made from Renewable Feedstocks with Degradability and Biocompatibility

Super-strong, sustainable, and biodegradable adhesives are developed using lactic acid and mussel adhesive chemistry, offering nontoxic, biocompatible solutions for biomedical and electronics applications.

High strength adhesives are in demand for a variety of applications due to their ability to create lightweight, nondestructive bonds between substrates. To obtain such adhesion, several synthetic polymers are used in adhesives such as Gorilla Glue, Super Glue, and Elmer's glue. Unfortunately, these synthetics often require massive amounts of oil during manufacturing and are not biodegradable, which limits their use in many applications such as biomedical products.

Purdue University researchers have developed super strong adhesives by incorporating lactic acid with mussel adhesive chemistry. Lactic acid, which can be derived from corn, enables the incorporation of a sustainable monomer into the backbone and is FDA approved for internal use in humans, opening the door into many biomedical uses. The adhesives use a polyester backbone, which degrades into nontoxic components, a beneficial characteristic in surgical adhesives. In laboratory testing, this biomimetic approach has produced some of the strongest commercial adhesives ever.

To view a video related to this technology, click this link:
<https://www.youtube.com/watch?v=PReTYtw3MCM>

Advantages:

- Nontoxic and biocompatible
- Made from a renewable resource
- Sets when wet
- Environmentally friendly and degradable

Technology ID

2014-WILK-66644

Category

Chemicals & Advanced
Materials/Green & Bio-Based
Chemistry
Chemicals & Advanced
Materials/Coatings, Adhesives &
Sealants
Materials Science &
Nanotechnology/Biomedical &
Bioinspired Materials

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Potential Applications:

- Biomedical industry
- Electronics industry
- Cosmetics industry

TRL: 2

Intellectual Property:

Provisional-Patent, 2015-02-21, United States | PCT-Patent, 2016-02-19, WO
| NATL-Patent, 2017-08-21, United States

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