LICENSING OPPORTUNITY

#2016-042

Biorenewable Epoxy Resins Derived From Phenolic Acids

Summary

An innovative material and method for epoxy resins derived from phenolic acid rather than traditional bisphenol A diglycidyl ether (DGEBA). Phenolic acids have desirable rigid structures that result in a stiff and heat-resistant epoxy resin material. Additionally, phenolic acids are derived from non-toxic and renewable plant sources. The method of producing phenolic acid based epoxy resin includes converting the phenolic acid into an epoxidized form. This conversion is followed by curing with a curing agent, which is similar to the curing process for DGEBA-based epoxy resins. Two types of epoxidized phenolic acid are used for epoxy resin: epoxidized salicylic acid (ESA) and epoxidized 4-hydroxybenzoic acid (E4HBA). Both ESA- and E4HBA-based epoxy resins exhibit stiffness and strength superior to DGEBA-based epoxy resin. Furthermore, E4HBA-based epoxy resin exhibits resistance to both heat and elongation comparable to DGEBAbased epoxy resin. Additionally, both the ESA- and E4HBA-based epoxy resins are capable of triggered degradation.

Competitive Advantages

- Epoxy resin derived from renewable, non-toxic sources, such as agricultural products
- 12% increase in tensile strength compared to DGEBA-based epoxy resins
- 16% increase in modulus in comparison to DGEBA-based epoxy resins
- Comparable elongation at break values and glass transition temperatures to DGEBA-based epoxy resins
- Capable of triggered degradation, which will decrease the amount of non-degradable waste in landfills

Meet the Inventor

Dr. Megan L. Robertson

Assistant Professor CHEMICAL AND BIOMOLECULAR ENGINEERING





Problem Addressed

- Increasing concerns regarding the health effects of DGEBA-based epoxy resins
- Negative environmental impacts of petroleum based non-degradable epoxy resins
- Developing a sustainable and renewable source for epoxy resins that has comparable mechanical and thermal characteristics to petroleum based epoxy resins
- Decreasing the environmental impact of non-degradable waste in landfills

Applications

- Replacement for traditional petroleum derived epoxy resins
- Composite materials, like those utilized in the wind power and automotive industries
- Protective coatings
- Adhesives

Patents

US2017/046789

Contact

Shaheen Lokhandwala Technology Licensing Associate oipm@Central.uh.edu | 713-743-9195 Case ID: 2016-042

UNIVERSITY of HOUSTON INTELLECTUAL PROPERTY MANAGEMENT