TECH OFFER

Customizable Green Resins and Green Composites for a Sustainable Future

KEY INFORMATION

TECHNOLOGY CATEGORY:
Materials - Composites
Chemicals - Polymers
Chemicals - Organic

TECHNOLOGY READINESS LEVEL (TRL): TRL5
COUNTRY: SINGAPORE
ID NUMBER: TO175195

OVERVIEW

Commercially available fiber-reinforced polymer (FRP) systems are primarily based on petroleum-derived resins and synthetic fibers such as glass and carbon, which are not sustainable. These conventional resin formulations contain highly volatile organic compounds (VOCs) that are harmful to both human health and the environment, while their production also results in a significant carbon footprint. As industries seek more eco-friendly solutions, there is a growing market demand for sustainable alternatives, such as green resins and bio-carbon composites.

To improve safety and reduce the carbon footprint, the technology owner has developed a series of green resins that contain up to 85% bio-carbon and are low in VOCs. Produced from renewable feedstock, these green resins are less hazardous and require minimal GHS labelling (i.e., 1 GHS or no GHS). Their mechanical, thermal, and chemical properties are comparable to those of petroleum-based resins. Additionally, their use of renewable feedstock aligns with increasing regulations and consumer demand for sustainable solutions, crucial for reducing industrial carbon footprints and promoting safer manufacturing practices. These

eco-friendly alternatives offer reduced VOC emissions, a lower environmental impact, and align with the increasing focus on sustainability.

The technology owner is eager to collaborate with industrial partners on co-development and proof-of-concept trials to evaluate the performance of green resins and composites and explore their potential applications. The ideal partners could be fast-moving consumer goods (FMCG) manufacturers, specialty chemical companies, automotive and appliances companies.

TECHNOLOGY FEATURES & SPECIFICATIONS

- High strength-to-weight ratio: offers excellent performance while minimizing material usage
- Environmentally friendly: derived from sustainable and renewable feedstock, reducing reliance on petroleum-based sources.
- Customizable formulation: tailored to meet specific needs, in terms of mechanical strength, chemical, and thermal properties, curing time, etc.
- Strong adhesion: ensures reliable bonding to various substrates such as concrete, wood, PVC, metal, etc.
- High flexibility: easily moulded into various shapes and sizes
- Durability: Maintains integrity over time, ensuring product longevity

POTENTIAL APPLICATIONS

The potential applications of green resins and composites include, but are not limited to:

- **Consumer goods:** products in the sports, leisure, and recreational industries
- **Appliances:** both household and industrial usage
- **Civil and infrastructure sectors:** building and construction materials
- **Automotive industry:** light weight vehicle parts and components
- **Furniture and interior design:** eco-friendly materials for furniture and home décor

UNIQUE VALUE PROPOSITION

- **Highly sustainable:** made from up to 85% bio-based materials, reducing environmental impact
- **Safer with lower VOCs:** emits fewer VOCs with a vapor pressure below 30Pa, compared to the typical 700Pa
- **Customizable formulation:** can be tailored to meet specific customer needs for greater flexibility