Bio-Based Highly (Meth)Acrylated Resins and Thermosets (RFT-459 and RFT-489)

Invention Summary

Thermosetting polymers and composites are widely used in industry due to their many desirable characteristics, such as low density and cost, dimensional stability, and good mechanical properties. However, most of these resins are petroleum-based raising environmental concerns and potentially increasing cost and regulations. Thus, there is a demand for novel resins and composites synthesized from renewable materials, such as plant oils. Webster et al. answer that need with a novel bio-based resin containing a large number of unsaturated vinyl groups. Specifically, they have developed a polyfunctional bio-based oligomer synthesized from an epoxidized sucrose fatty acid ester resin and an ethylenically unsaturated ester (RFT-459). More recent modifications by the group (RFT-489) have added an acid anhydride leading to a vinyl functionalized resin with a lower viscosity. The resins can then be cured using free radical initiators to form highly crosslinked thermosets with numerous applications. These systems use significantly lower amounts of styrene than petrochemical vinyl ester resins.
Benefits

- Environmentally friendly, sustainable, and versatile in use
- Significantly improved properties over existing bio-based materials
- Enhanced properties competitive with petrochemical based materials
- Applications in coatings, composites, adhesives, and dental materials

Technology

The technologies include the polyfunctional bio-based oligomers, curable coating compositions,
and methods of making the materials. RFT-489 is an improvement over the technology described in RFT-459, developed in the same laboratory.

**Patents**

This technology is the subject of Issued US Patent No. 9,765,233 and is available for licensing/partnering opportunities.

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**Technology Key**

RFT, 459, 489, RFT459, RFT489