Small Molecule Solvent Recycling of Adaptable Polymers (#7348)

A method for recycling and repairing carbon fiber reinforced polymer products

Georgia Tech researchers have developed a method for recycling and repairing CFRP products. These products are recycled by dissolving them in a solvent, separating the carbon fibers, and evaporating the solvent to reform the polymer. The reclaimed fibers and polymer have the same mechanical properties as the fresh material and can be reformed and reused in new products. A similar method is used to repair surfaces of CFRP products. This is a major improvement to current repair processes, which require applying pressure to repair surfaces, which are difficult to do in situ.

Benefits/Advantages

- Safe – Does not require strong chemicals
- Environmentally Friendly – Does not generate waste solutions
- Efficient – Can 100% recycle both fiber and polymer
- Effective – Ability to fully repairs surfaces
- Simpler – Does not require a pressurized environment to repair surfaces

Potential Commercial Applications

- Composite repair and recycling
- Plastics industry
- Aerospace industry
- Automobiles industry
- Sporting goods

Background/Context for This Invention

Carbon fiber reinforced polymer, CFRP, is a highly sought after composite for its high strength, high stiffness, and lightweight properties. The recycling process, however, is difficult because the polymer and carbon fiber components have to be separated. The difficulty in recycling combined with the increasing demand has caused an increase in the amount of waste material in both the manufacturing process and from end-of-life products. Thus, there is a need for a method to easily recycle CFRP.

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More Information

Publications

For more information about this technology, please visit:
https://licensing.research.gatech.edu/technology/small-molecule-solvent-recycling-adaptable-polymers

Images:

The automated sequential delivery of multiple fluids. A varying number of delay gates imprinted in the branches are shown in the figure.

COVID-19 and flu saliva test on paper: (A) The automatic sequential delivery of multiple reagents required for virus test; (B) Water pouring into the device triggers the virus assay, allowing the presence of SARS-CoV-2 and influenza A & B viruses to be visually identified by the color changes in the corresponding detection spot