Clemson University Research Foundation

Commodity Self-Healing Copolymers (2018-027)

Advanced Materials with Self-Healing Properties made from Commodity Monomers

Market Overview

These materials are produced from commodity monomers with specific predefined compositions and exhibit self-healing properties for applications plastics, composites, coatings, paints, and other applications. According to Grand View Research, the global polymer market is projected to grow at a CAGR of 26.4% from 2017 to 2025 and is expected to reach $4.1 billion by 2025. Preexisting self-healing materials rely on methods such as encapsulated fluids which fill damaged areas, nanomaterials that respond to electromagnetic fields, or some that incorporate living organisms into the material. Clemson University researchers have developed self-healing materials that are produced using commonly available monomers. Self-healing materials made with these copolymers are more cost effective as a result and could become more prolific than their predecessors.

Application

Plastics; paints and coatings

Stage of Development

Lab Scale Prototype

Advantages

- Commodity copolymers self-heal using van der Waal forces, requiring no external stimuli
- The copolymers can self-heal multiple times, increasing the durability of the material
- Self-healing materials last longer, reducing costs in repairs and replacement

Technical Summary

Commodity copolymers, such as methyl methacrylate/n-butyl acrylate (pMMA/nBA) and their derivatives exhibit self-healing properties when combined in certain monomer ratios. Self-healing materials without human intervention can benefit many fields, from medical devices to aerospace industries. These copolymers rely on van der Waal forces to self-heal and provides a simple alternative to repairing materials using traditional methods. Since these copolymers are commonly known and accessible this invention provides an easier and cheaper self-healing solution.

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App Type	Country	Serial No.	Patent No.	CURF Ref. Number	Inventors
Provisional	United States	62/702,410	NA	2018-027	Marek W. Urban

About the Inventors

Dr. Marek W. Urban is the Sirrine Foundation Endowed Chair and Professor at the Department of Materials Science and Engineering at Clemson University. He received his Ph.D. from Michigan Technological University in 1984. Since then he has as the director of the Industry/University Cooperative Research and Materials Research Science and Engineering Centers funded by the National Science Foundation. In addition he has served as department chair at North Dakota State University and the University of Southern Mississippi. Having published over 300 research papers and the author of three books and creator of several patents, he has received multiple awards and featured by a multitude of media. His research interests include polymer design, self-healing polymers, and stimuli-responsive materials.

For More Information

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