HIGH PERFORMANCE NANOCOMPOSITES

MATERIALS SYSTEM REINFORCED WITH HIGHLY ENTANGLED AND MECHANICALLY INTERLOCKED NANOSTRUCTURES

TECHNOLOGY FIELD

Composites, Materials, Nanostructures

IP PROTECTION

Patent Pending

RESEARCHER

Dr. Davood Askari is an Assistant Professor of Mechanical Enineering at Wichita State University. Dr. Askari has attended Sharif University of Technology, Eastern Mediterranean University, and University of Hawaii at Manoa. His research interests include: design, modeling, analysis, abrication, and testing/characterization of many materials. bese materials are composites and nanocomposites, thin films, hydrophobic surfaces, carbon nanostructures, NanoNeedles, and 3D nanostructures, devices and systems.

BACKGROUND

Composite materials have the ability to be used in many different facets; however, there are limitations to this, as many properties cannot sustain new applications. Their strength wears down, the material becomes weaker, and the composite ends up failing. Many have researched how to allow for new composites that can be utilized in new ways. Due to this, there has been an inceased demand for high-performance materials that contain particular desired properties and multifunctional capabilities.

The concern with traditional structural composites lies in their weak through-the-thickness and interlaminar properties. Because of the through-the-thickness' and interlaminar's dependence upon the weak matrix, there exists poor qualities in these areas. These weaknesses often lead to failures in the composites. In the case of failure, there can be an endangerment of someone's life. Researchers believe that this possibility must be corrected and composites must be developed in new ways to divert any issues that materials currently face.

ADVANTAGES

Carbon Nanocomposites are capable of reinforcing through-the-thickness in different composite materials. Their quality of using high density arrays of vertically aligned carbon nanotubes (CNT), the fracture toughness, flexural modulus and strength, flexural toughness, damping, coefficient of thermal expansion, and through-thethickness thermal and electrical conductivities were improved. In addition, the adhesion of adjacent fabric layers can be improved through the use of CNT nanoforests that are normal to the laminae. This new technology can create stronger, more reliable products.

For additional information,please contact:
Rob Gerlach, Director of Intellectual Property & Technology Transfer
rob.gerlach@wichita.edu | (316) 978-6980

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