

Material Science: Fabric/Textiles

Title: *Fabric Based Laminar Composite and Method for Manufacture (UMD 07-03)*

Inventors: *Yong Kim et al.*

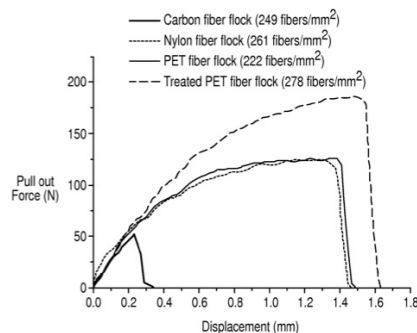
Applications: Fabrics with enhanced impact resistance for use in sports equipment, body armor, and other applications.

Benefits: Materials of the invention have the following benefits:

- Dramatically improved interlaminar shear strength and impact resistance
- Enhanced impact toughness
- Improved transmission properties (electrical and thermal conduction).

Technology Description: Layered fabric-reinforced composites are being increasingly sought for use in impact resistance materials (e.g. body armor). However, such materials generally have the structural drawback of poor interlaminar shear strength, with little or no fiber reinforcement in the thickness (Z-axis) direction, so that these materials have less inter-ply strength than longitudinal strength, which can result in poor impact and/or interlaminar flexural fatigue strength. Existing techniques to increase interlaminar strength of layered composite materials are difficult to implement on a commercial level for a number of reasons (cost, time, manufacturing difficulties, etc.). This invention overcomes this problem by the creation of a “reinforcement zone” between laminar layers by the flocking of short Z-Axis reinforcing fibers onto individual (uncured) resin impregnated fibrous layers such as woven fabric. Individual layers can then be assembled one on top of the other to create a “wet lay-up” laminar assembly, with the resulting reinforced organic polymer organic structure impregnated with uncured liquid resin and cured in an heated laminating press or autoclave.

Patent Status: [US Patent No. 7,981,495.](#)



Treated PET flock fibers show the highest fiber pull-out force/strength among all fibers tested.

For more information: David J. Glass, Ph.D.
 Technology Transfer Consultant
 University of Massachusetts Dartmouth
 UMass office: 508-910-9815
 Cell: 617-653-9945
djglass@umassd.edu

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