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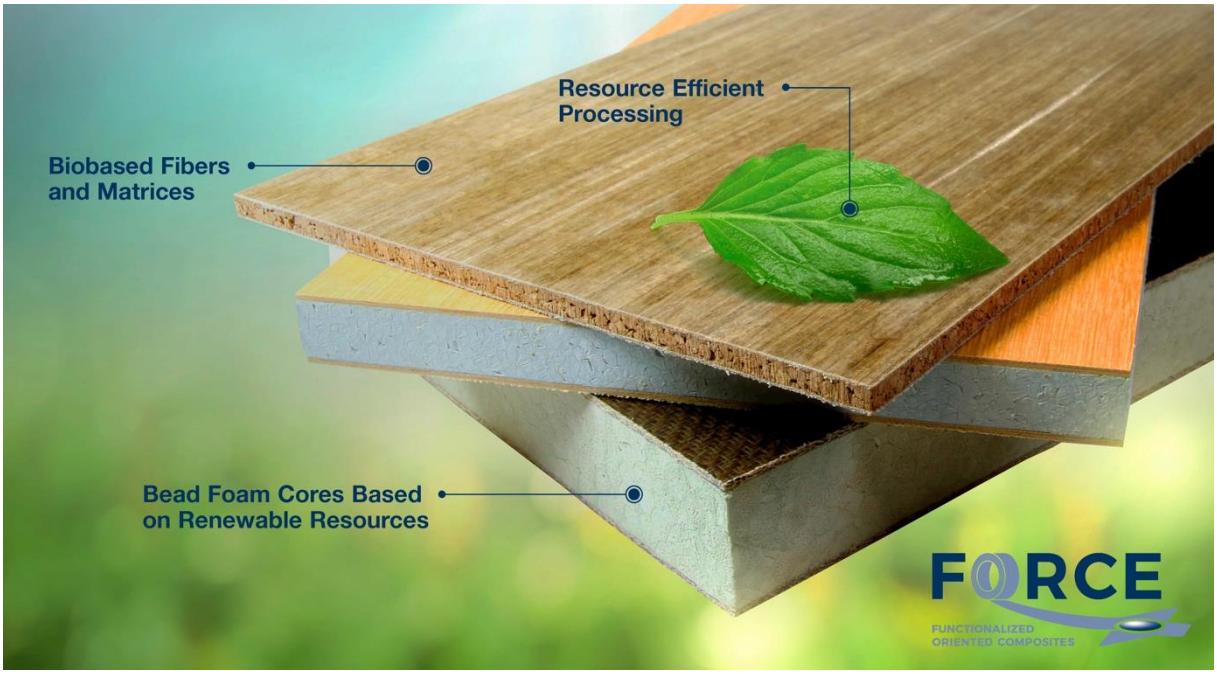
Sustainable Composites in Focus: Advancing Green Competitiveness

At JEC World 2025, the world's leading trade fair for composite materials, which takes place from March 4 to 6 in Paris, the Department of Polymer Engineering at the University of Bayreuth will be presenting its latest breakthroughs in composite materials and sandwich structures together with the Research Institute Neue Materialien Bayreuth GmbH in the Composites United e.V. pavilion (Hall 6, Booth R24).

This year, the focus will be on sustainable materials and energy-efficient processing for composite structures supported by digital technologies. While polymer composites have gained prominence for weight saving reasons, there are concerns about their environmental impact and high cost due to the limited number of recyclable and renewable materials and energy-intensive processing.



Innovative Solutions in Material Development

In response to the growing importance of sustainability in the selection of materials, both the Polymer Engineering department and Neue Materialien Bayreuth GmbH have focused their efforts on environmentally friendly polymers. In addition to bio-based thermosets, vitrimers and natural fibers with corresponding prepreg systems, ongoing research is exploring foam cores derived from renewable or recyclable sources, be it bead or extruded foams.
Preference is given to customized hybrids that strike a balance between economic and ecological goals. Here, life cycle analysis (LCA) serves as a robust tool for assessing the environmental impact of all product phases, from raw material extraction to disposal. This advanced polymer research is conducted by a dedicated team consisting of chemists, engineers, and application experts with extensive experience in materials development, enhanced by digital technologies to increase efficiency and improve material performance insights.

Energy-Efficient Processing

In addition to the selection of materials, the optimization of production processes by reducing energy consumption while maintaining fast cycle times is of crucial importance. Research focuses on innovative methods such as the seamless fusion of particle foams or the UV curing of thermosets, which pave the way for economically competitive production processes.

Another focus is the FORCE process chain, which streamlines the production of thermoplastic fiber-reinforced composites through advanced multiaxial tape-laying methods. This customized preforming approach reduces waste to less than 5% while enabling fast processing times.

About the Institutes

The Department of Polymer Engineering of the University of Bayreuth is engaged in scientific and application-oriented research on polymers and advanced composites. Neue Materialien Bayreuth GmbH, a non-academic research institute, is a pioneer in the development of new materials for lightweight construction. Together with the Polymers Division of Neue Materialien Bayreuth GmbH, which is headed by Professor Dr.-Ing. Holger Ruckdaeschel, they offer comprehensive expertise in modern polymer materials and their processing. They bridge the gap between basic science and the requirements of industry and are proud to be reliable partners for industrial players investing in innovative polymers and their processing.

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