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Processing Opportunities in Natural Fiber Composites – Retting, Surface Modification, and Preform Manufacturing Synergy

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Abstract

Utilization of lightweight, low-cost natural fibers offers the potential to replace a large segment of the glass and mineral fillers in numerous automotive interior and exterior parts. In the past decade, natural-fiber composites with thermoplastic and thermoset matrices have been embraced by car manufacturers and suppliers for door panels, seat backs, headliners, package trays, dashboards, and interior parts. Natural fibers such as kenaf, hemp, flax, jute, and sisal are providing automobile part reinforcement due to such drivers as weight reduction, cost, CO_2 reduction, less reliance on foreign oil sources, recyclibility, and the added benefit that these fiber sources are "green" or eco-friendly. However, major challenges remain in order to achieve large-scale automotive insertion. In this paper, three critical barriers will be discussed including (1) fiber retting processes and the barrier to rapid fiber preparation, (2) production methods for fiber performs tailorable to specific applications, and (3) rapid composite molding processes applicable to high-volume manufacture. Alternatives to each of these challenges will be presented and strategies for process development will be discussed.