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Discontinuous Fiber Composites

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Discontinuous fiber-reinforced polymers have gained importance in the transportation industries due to their outstanding material properties, lower manufacturing costs and superior lightweight characteristics. One of the most attractive attributes of discontinuous fiber reinforced composites is the ease with which they can be manufactured in large numbers, using injection and compression molding processes.

Typical processes involving discontinuous fiber reinforced thermoplastic composite materials include injection and compression molding processes as well as extrusion. Furthermore, the automotive and appliance industries also use thermosets reinforced with chopped fibers in the form of sheet molding compound and bulk molding compound, for compression and injection-compression molding processes, respectively.

A big disadvantage of discontinuous fiber composites is that the configuration of the reinforcing fibers is significantly changed throughout production process, reflected in the form of fiber attrition, excessive fiber orientation, fiber jamming and fiber matrix separation. This process-induced variation of the microstructural fiber properties within the molded part introduces heterogeneity and anisotropies to the mechanical properties, which can limit the potential of discontinuous fiber reinforced composites for lightweight applications.

The main aim of this Special Issue is to collect various investigations focused on the processing of discontinuous fiber reinforced composites and the effect processing parameters have on fiber orientation, fiber length and fiber density distributions throughout the final part. Presenting investigations on the effect fiber configurations have on the mechanical properties of the final composite products and materials are welcome in the Special Issue. Researchers who are modeling and simulating processes involving discontinuous fiber

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composites as well as those performing experimental studies involving these composites are welcomed to submit papers. Authors are encouraged to present new models, constitutive laws and measuring and monitoring techniques to provide a complete framework on these groundbreaking materials and facilitate their use in different engineering applications.