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Advanced methods for modeling and characterization of discontinuous fiber reinforced polymers

Nils Meyer, Johannes Görthofer

Karlsruhe Institute of Technology (KIT), Germany

Discontinuous fiber reinforced polymers (FRPs) are used frequently in various engineering application fields due to their specific material properties and the possibility to design resource-efficient and cost-efficient components. The application range can be extended by hybridization with metallic inserts or co-molding with continuous fiber reinforcements. The structural behavior of these materials is highly influenced by the material composition and the manufacturing process, leading to heterogeneous microstructures. Thus, on the one hand, advanced characterization methods are required to identify corresponding effects ranging from nano scale to component scale. On the other hand, computational engineering methods need to account for all important aspects of the FRPs to correctly predict the flow and structural behavior.
The aim of this minisymposium is the presentation and discussion of holistic integrated approaches for discontinuous FRPs. It should bring together participants with an experimental characterization background and those with a background in simulation and modeling. Possible characterization topics range from quasi-static to dynamical testing under varying conditions, analysis of microstructures, interface characterization to novel experimental methods. Corresponding simulative approaches may consider solid and fluid mechanics, optimization, phase field modeling, homogenization methods, or upscaling methods. Aspects considered include, for example, hybridization effects, fiber orientation distribution, fiber length distribution, humidity, temperature effects and constitutive modeling taking into account thermomechanical, kinetic, interface, plastic, viscous, damaging or dynamical effects.