Multiphase Materials and Integrative Simulation
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Modern numerical methods for the simulation of multiphase materials have to account for the detailed properties of the components. Procedures for the design of such material models are based on homogenization techniques or FE-modelling of representative volume elements subjected to characteristic loadings. These materials are able to consider nonlinear and anisotropic behaviour and are therefore in particular suited for fiber reinforced plastics. Thus a major application is actually the simulation of injection moulded plastic structures with fiber reinforcement. Also the manufacturing process results in an inhomogeneous distribution of material phases which have to be accounted for in the material modelling. Therefore the simulation of the behaviour for such structures have to be "integrative" which means to consider the effects of manufacturing, design the material model on basis of the micro-scale properties of the material components and transfer the resulting properties to the macro-scale structure. The presentation gives an introduction in the material modelling and the integrative solution using the software DIGIMAT.