



Coupling Experiments with Modelling for Process and Product Design of Polymers

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Polymerization processes, including solution, emulsion or high-pressure polymerization, are an integral part of the chemical industry and give access to a wide range of different products with an enormously broad application range from packaging, adhesives or coatings to medical or pharmaceutical applications and many more.

However, understanding and modeling the complex underlying kinetic and thermodynamic processes (esp. for multi-phase systems) is still a challenge today. Through mini-plant scale experiments and comprehensive polymer analytics valuable information of process-product properties can be collected. This information can be used to set-up and validate multi-scale models for polymerization processes, e.g. to connect process conditions with polymer rheology or to investigate emulsion polymerization within 3D-printed reactors. Subsequently, such models can be used for simulation-based process optimization or product design.