



Faculty of Applied Science
CHEMICAL ENGINEERING



“Polymer Reaction Engineering Modeling in Industry”

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Dupuis Hall, Room 215

ABSTRACT

The description of polymerization processes by means of fundamental mathematical models is a challenging problem. At the same time, these models offer a very powerful tool for process control, monitoring and optimization, scale up, operator training and often allow for a better understanding of underlying mechanisms.

An industrial perspective for the development of polymer reaction engineering models and their application to create new materials, products, and improved or novel processes is given. The challenges specific to polymer reactor modeling are discussed. Four components of a polymer reactor model (kinetics, thermodynamics, transport effects, and particle dynamics) are discussed with illustrative examples. Also, the important task of a careful and thorough parameter evaluation is briefly addressed as this is a prerequisite of predictive modeling. Finally typical model outputs are shown to demonstrate that a first-principles model supported and validated by experiments can be a very effective means for fundamental understanding of polymer reactors and is a recommended alternative to empirical methods and experimentation alone.