processes

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Editorial

Special Issue "Polymer Modeling, Control and Monitoring" of Processes

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Academic Editor: Michael Henson
Received: 25 July 2016; Accepted: 25 July 2016; Published: 29 July 2016

Polymers range from synthetic plastics, such as polyacrylates, to natural biopolymers, such as proteins and DNA. The large molecular mass of polymers and our ability to manipulate their compositions and molecular structures have allowed for producing synthetic polymers with attractive properties. As such, synthetic polymers have been increasingly used in a large number of applications such as paints, coatings, fibers, flexible films, automotive parts, adhesives, fuel cells, batteries, medicine, and controlled drug delivery. For example, only in 2013, around 299 million tons of plastics were produced, and this level has increased since then. Worldwide polymer production is expected to grow, as polymers steadily replace materials such as glass, wood and metals, our understanding of polymers improves, and new polymers with remarkable characteristics are synthesized. Because of the huge production volume of commodity polymers, a little improvement in the operation of commodity-polymer processes can lead to significant economic gains. On the other hand, a little improvement in the quality of specialty polymers can lead to substantial increase in economic profits.

This Special Issue includes papers that investigate different approaches to improving polymers, polymer processes, and processes that use polymers. These approaches include state and parameter estimation in polymerization reactors, polymerization reactor modeling for process monitoring, polymerization reactor monitoring, design of optimal polymerization experiments, use of polymeric membranes in integrated gasification combined cycle units, model-based design of polymerization reactors, and polymerization reactor modeling.