Online Measurement and Control of Polymer Properties – Benefits, Challenges and Enabling 'Smart Manufacturing'

Michael F. Drenski, Fluence Analytics, New Orleans, USA; Prof. Wayne F. Reed, Tulane University, New Orleans, USA; Dr. Rick Montgomery, Fluence Analytics, New Orleans, USA; Natalie Leonardi, Fluence Analytics, New Orleans, USA; Dr. Sigmund Floyd, Fluence Analytics, New Orleans, USA; <u>Alex W. Reed</u>, Fluence Analytics, New Orleans, USA

Online measurement, modeling and control of polymer properties has been an active topic of investigation for many years and is now entering an aggressive industrial adoption phase based on availability of synergistic solutions incorporating hardware, software and data analytics. Nevertheless, various challenges to widespread industrial use remain. In this presentation we will illustrate the value that can potentially be mined through online measurement and control of polymerizations, address the challenges and issues to implementation from an industrial perspective and compare some current technologies on the market which incorporate detection of polymer properties using viscometry, refractive index, UV, light scattering, near- and mid-IR and others. In particular the ACOMP system (Automated, Online Continuous Monitoring of Polymerization reactions) and its industrial usage will be described. Additionally, this presentation will review Smart Manufacturing initiatives in the United States, particularly with the Smart Manufacturing Leadership Coalition and recently funded by the U.S. Department of Energy's Advanced Manufacturing Office: Clean Energy Smart Manufacturing Innovation Institute (CESMII). The talk will review a small cross-section of how these new advanced measurement systems, coupled with artificial intelligence and advanced data analytics, merge with these Smart Manufacturing efforts to provide new insights into plant operations and opportunities for optimization in the polymer space.