

GÖCH-OBERÖSTERREICH PROGRAMMVORSCHAU

26.06.2017

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**“Radical Polymerization Kinetics and
Reaction Engineering of Functional
Acrylic Polymers”**

Johannes Kepler Universität Linz
17.15 Uhr, HS 12 (TNF-Turm)



Univ.-Prof.Dr. Günther Knör
Leiter GÖCH – Oberösterreich

RADICAL POLYMERIZATION KINETICS AND REACTION ENGINEERING OF FUNCTIONAL ACRYLIC POLYMERS

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ABSTRACT

Many low-MW reactive commercial dispersants, surfactants and coatings resins are synthesized by free radical polymerization (FRP) using functional comonomers such as glycidyl methacrylate, (meth)acrylic acid or 2-hydroxyethyl (meth)acrylate. An overview of the experimental and modeling tools used by the Hutchinson group to study these systems will be presented.

While FRP offers great versatility, the sequencing of units along each chain is stochastically controlled. Kinetic Monte-Carlo modeling is used to demonstrate that even under perfect control of overall copolymer composition, almost half of the polymer chains produced (number-average length of 20, with a single functional group per chain on average) contains no functionality. Vinylterminated macromonomer prepared by cobalt chain transfer polymerization provides one means to control the placement of functionality while maintaining the advantages of FRP operation.

In addition, controlled radical polymerization (CRP) has emerged as a promising route to overcome these limitations through the synthesis of low MW macromolecules with well-defined molecular weight, low polydispersities, and well controlled microstructure. The advantages of combining CRP with continuous reactors to increase the range of specialty products made for applications in coatings, inks, overprint varnishes and adhesives will be presented.