SL 02

MOLECULAR WEIGHT CONTROL IN EMULSION POLYMERIZATION BY CATALYTIC CHAIN TRANSFER

N.M.B. Smeets¹, J.P.A. Heuts², J. Meuldijk¹, M.F. Cunningham³, A.M. van Herk² ¹ Process Development Group, Eindhoven University of Technology, Den Dolech 2, 5612 AZ Einhoven, The Netherlands ² Polymer Chemistry Group, Eindhoven University of Technology, Den Dolech 2, 5612 AZ Einhoven, The Netherlands ³ Department of Chemical Engineering, Queens University, 19 Division St, Kingston, Ontario, K7L 3N6, Canada

Conventional chain transfer agents (CTA) (i.e. mercaptanes) generally are very hydrophobic and predominantly partition towards the monomer phase in an emulsion polymerization. Hence, hardly any chain transfer will occur in the aqueous phase and no influence of these CTA's on the emulsion polymerization kinetics is observed. Catalytic chain transfer agents (CCTA) however, often possess increased aqueous phase solubility and in combination with the high catalytic activity, this can result in a severe change of the polymerization kinetics, see Figure 1.



The work we report here investigates the effect of a fairly water soluble CCTA (i.e. COBF •) on the kinetics of a MMA emulsion polymerization. The investigation of radical entry and exit, CCTA partitioning, transport and mass decomposition leads to a better fundamental understanding of CCT in emulsion polymerization.

Final objective is to apply these catalysts in continuous emulsion polymerization to tailor the molecular weight distribution of the final polymer product.