

Modeling the Effects of Micromixing and Start-Up Procedures on Bulk Copolymerization and Copolymer in a Tubular Reactor

M. ATIQULLAH,^{1*} M. M. HASSAN,² and S. A. BEG²

¹Petroleum and Gas Technology Division, The Research Institute, and ²Department of Chemical Engineering, King Fahd University of Petroleum and Minerals, Dhahran 31261, Saudi Arabia

SYNOPSIS

The combined effects of micromixing and start-up procedures on free radical, bulk copolymerization of styrene and acrylonitrile in an isothermal, premixed-feed tubular reactor have been theoretically analyzed. An axial dispersion model, which takes into account the entire range of backmixing, forms the basis of this analysis. Model predictions show that the overall conversion decreases with the increase of initial styrene content in the reactor, and is not affected by the degree of micromixing. However, for the nonazeotropic feed, the copolymer composition distribution becomes wider with the increase of initial acrylonitrile content in the reactor. For the azeotropic feed, broadening occurs with the decrease of initial acrylonitrile content in the reactor. Average copolymer composition is not affected either by micromixing or start-up procedure.