

Steady-state Modeling and Analysis of a Multistage Olefin

김경주, 박명준, 송인협, 오상준¹, 이현구*
서울대학교 응용화학부; ¹한국과학기술원
(hkrhee@snu.ac.kr*)

In this study we performed the modeling and analysis of a commercial multistage olefin polymerization system. The system consists of two bulk slurry reactors in series followed by two fluidized bed reactors in series. The modeling of this work aims at the prediction of the macro-scale properties such as the average molecular weights and the melt index. For this purpose, two-phase models are employed for both the slurry reactors and the fluidized bed reactors. Diffusion limitation in the growing particles is not considered. These measures lead to a rather simplified first principles model of the system but it is found suitable for the prediction of macro-scale properties by using the plant data. An empirical correlation is used for the prediction of the melt index. Having conducted numerical simulation systematically, we are able to develop a correlation between the melt index of the final product and the melt indices of the intermediate products, and thereby construct an operational strategy to obtain a polymer product with desired macro-scale properties which may be applied in local industries to produce polymer products with properties required in the market.