Modeling and simulation of gas-phase polymerization process for linear low density polyethylene production

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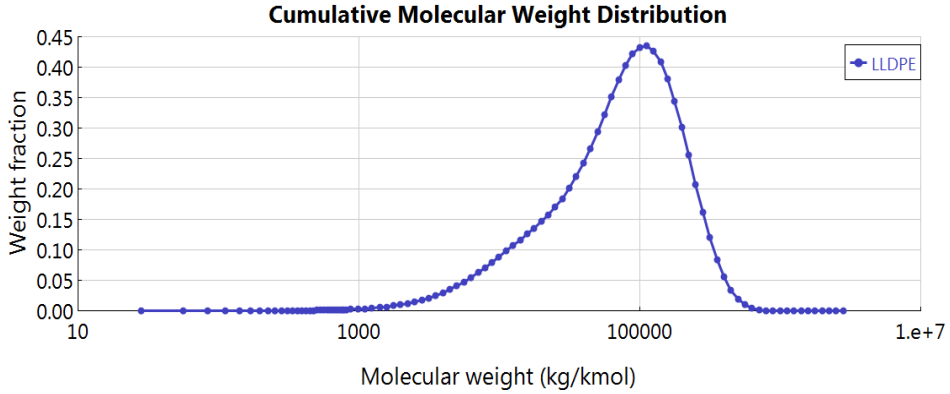
In recent years, the manufacturing process of linear low density polyethylene (LLDPE) using the gas-phase polymerization has been the latest generation of polymer production. Fluidized bed reactor is one of the main units for the polymerization process used to produce polymer with high efficiency and stability. The modeling of polymer production process is mainly aimed to predict the polymer characteristics and evaluate the reaction kinetics of polymer in an industrial scale. In this research, the modeling and simulation of gas-phase polymerization process for LLDPE production are performed using a process flowsheet simulator in the Aspen Plus software. The novelty is the fact that a comprehensive hydrodynamic model able to predict the flow behavior of polymer in the domain of fluidized bed reactor is developed by combining all important kinetics of LLDPE polymerization. The results show that the model prediction can describe the molecular weight distribution which is in good agreement with the industrial data. The average molecular weight of the polymer increases as the rate of the polymerization reaction increases. As the molecular weight of the polymer increases, higher gas phase monomer must be employed in order to retain the desired fluidization regime.



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