Dynamic modeling of a catalytic fixed-bed reactor for direct dimethyl-ether synthesis

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The purpose of this study is to produce a dynamic simulation method of a fixed-bed reactor using an imaginary input stream with assumed molar concentration, temperature and flow rate. We adopted several assumptions to simplify the simulation process. Pulverized catalysts fill in the shell-and-tube type fixed bed reactor to enhance various chemical reactions involving surface adsorption. parameters such as diffusion coefficient or thermal conductivity is held constant. Simulation with direct dimethyl ether synthesis process is shown as an example. Its steady state simulation result is compared with the published pilot plant data and possible dynamic change of the system is suggested.