Fixed-Bed Reactor Modeling and Analysis for direct DME Synthesis

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Dimethyl ether(DME) is gaining attention for being an alternative fuel resorce which might have possibilities to substitute traditional fossil fuel in the near future. A theoretical modeling of direct DME synthesizing fixed-bed reactor using hybrid catalyst pellets composed of mixtures of powder-formed methanol synthesis catalyst (CuO/ZnO/Al2O3) and methanol dehydration catalyst (γ-alumina) is performed to predict rate of DME synthesis using MATLAB 2009a. Experimental data is obtained from demo reactors and compared with the theoretical result. Employed reactor is shell-and-tube type approximated to 1-dimensional heterogeneous environment.