Boonlerd Boonsomlanjit 2008: Differential Flow Instability in Packed-bed reactors in the Presence of Catalyst Deactivation. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Assistant Professor Attasak Jaree, Ph.D. 60 pages.

Unsteady state operation of packed-bed reactors can result in different thermal behaviors such as pre-extinction waves, resonance effect, creeping thermal front. Catalyst deactivation also contributes to the dynamic features of such systems. A first-order exothermic reaction in a packed-bed reactor and a first-order deactivation model were simulated. Moving hot spot occurs at slow rates of deactivation. The activity profile indicates that catalyst deactivation is not uniform throughout the reactor bed. Pre-extinction waves with high temperature result from fast deactivation. Imposed inlet temperature oscillations were found to be amplified to a greater extent with the presence of catalyst deactivation.

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