

Pacharapon Jaipet 2014: Prediction of Catalyst Deactivation during Hydrogen Production by Steam Methane Reforming under Different Operating Conditions. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Phungphai Phanawadee, D.Sc. 72 pages.

Numerical simulation was performed to investigate the reactor performance for steam methane reforming with catalyst deactivation. It was assumed that the reactor is a plug flow reactor packed with non-porous catalyst. The rate of change in the catalyst activity was described by the power-law. The non-uniform activity distribution in the catalyst bed is shown to develop during the operation period. In order to estimate the date to replace the catalyst, the activity profile at the present time should be known. It was shown that the present average activity of the catalyst, not the activity profile, can be estimated from the present operating conditions and reactor output. The use of the average activity to estimate the date for catalyst replacement is discussed and its limitations are reported.

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Thesis Advisor's signature