

Nattapong Pongbotr 2012: Mathematical Analysis for Diffusion-Irreversible Adsorption Systems: TAP and Wet Impregnation Cases. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Phungphai Phanawadee, D.Sc. 91 pages.

TAP multi-pulse experiments with irreversible adsorption were simulated to investigate the characteristics of the curve describing the relation between normalized estimated adsorption rate constant ($\bar{\psi}_{est}$) and average surface coverage of catalyst bed ($\bar{\theta}_{avg}$) for different length ratios of the catalyst bed to the reactor for both porous and nonporous catalyst cases. It was found that when the effectiveness factor (η) is 0.1, the $\bar{\psi}_{est} - \bar{\theta}_{avg}$ curves decrease with two distinctive regions of slope while the plots for the cases when η is 0.3 and nonporous catalyst are close to linear. In addition, the patterns of intraparticle distribution previously found in TAP experiment were also numerically proven to be able to describe metal precursor profile of the catalyst prepared using wet impregnation method.

Student's signature

Thesis Advisor's signature