

Chemical Engineering Journal (Amsterdam, Netherlands) (2006), 119(1), 27-36

**Hydrodynamic and Transport Parameter Sensitivity in the Simulation of Non-Isothermal Agitated Gas-Liquid Reactors**

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**Abstract**

A generalized mathematical model has been developed to analyze steady-state behavior of non-isothermal mechanical agitated gas-liquid reactors. The model takes into consideration gas absorption with interphase mass transfer-reaction effects on the basis of bubble sphericity; mode of physical contact; variation of transport, hydrodynamic, and associated parameters by way of empirical correlations; and reactor and impeller geometry. A numerical sensitivity study is presented for a standard-configuration reactor in which an exothermic general bimolecular, second-order, reaction takes place. The analysis demonstrates that the confluence of mode of physical contact, variation of transport, hydrodynamic, and associated parameters, can lead to remarkably different portraits of steady-state multiplicity as opposed to those reported in the literature. Important results include the signal effect of the degree of agitation on the regions and patterns of multiplicity, as well as the conservative character of the multiplicity criteria reported in earlier studies of this reactor.