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A Global Reaction Mechanism for Transient Simulations of Three-Way Catalytic Converters

By Raoul Holder

Cuvillier Verlag Sep 2008, 2008. Taschenbuch. Condition: Neu. Neuware - The complex interactions between chemical kinetics and transport phenomena of mass, momentum and energy lead to incomplete fuel combustion, which is the origin of pollutant formation of internal combustion engines. Vehicle exhaust gas emission control devices have continuously been improved to meet the constantly tightened standards. Three-way catalyst technology is extensively used for the purification of automotive exhaust gases, usually in combination with monolithic (honeycomb) reactors. A promising alternative to the time consuming and costly engine and vehicle experiments are catalytic reactor model. In this work a global reaction mechanism for three-way catalysts is developed including 16 reactions and 12 gas phase species. The reaction mechanism is combined with an empirical oxygen storage model and validated against a number of different real engine experiments carried out on both fresh (not aged) and aged catalysts. Once the mechanism is validated against the fresh system, the adaption to the aged system is achieved solely by the reduction of the available reactive surface area of the washcoat, without tuning the individual reaction parameters. Finally the parameter set of the aged system is used to simulate a FTP75 drive cycle and the results are compared...



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