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Automotive Exhaust  
Aftertreatment

CAE

# CATRAN



*Catalytic Converter  
Simulation*

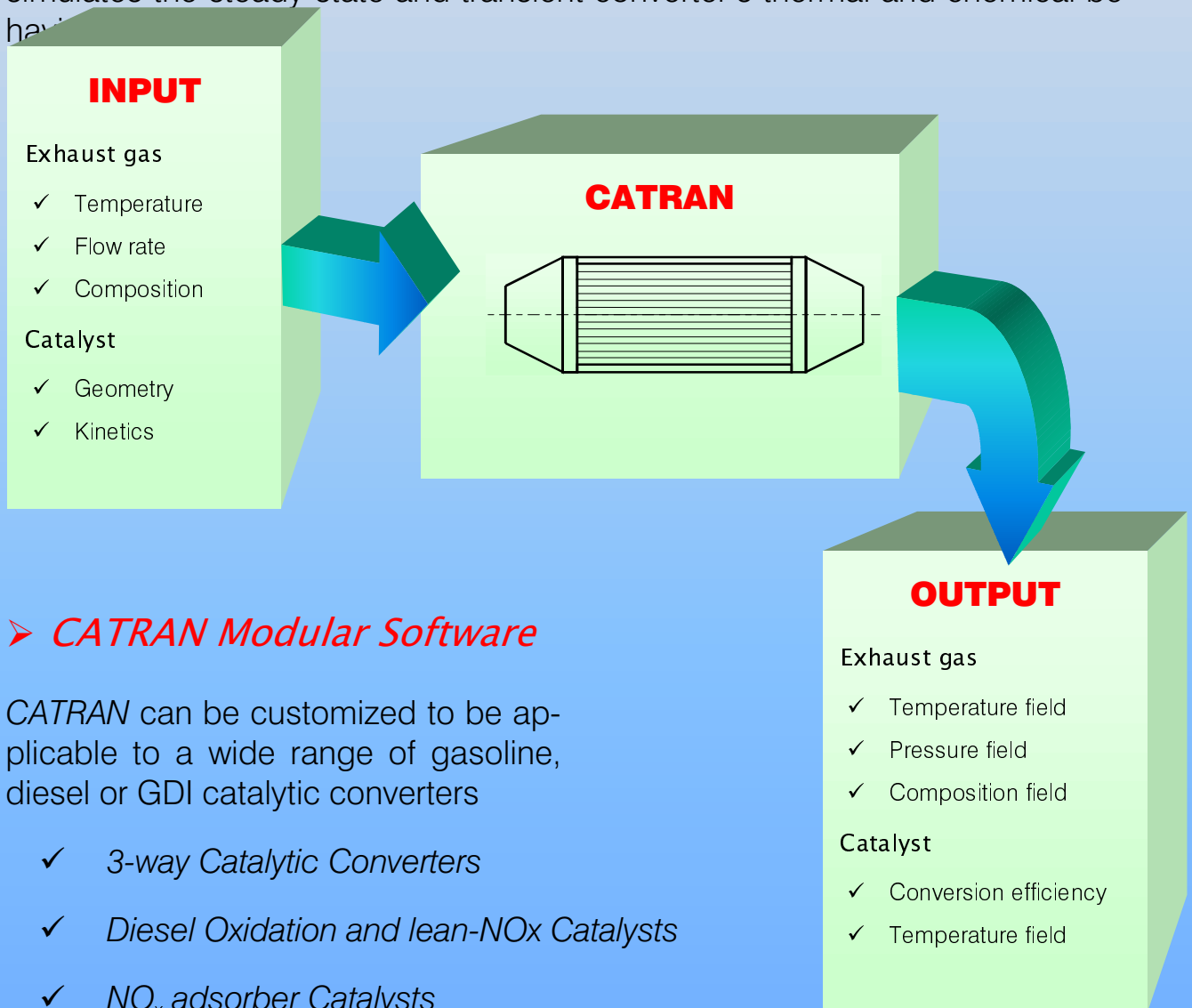
*Optimization  
with Computer-Aided Engineering*

# CATRAN

## *Mathematical Modeling of Automotive Catalytic Converters*

### ➤ *Computer Aided Engineering Approach*

Efficient design optimization of catalytic converters requires CAE assistance, to take into account complex transport and reaction phenomena. *CATRAN* simulates the steady-state and transient converter's thermal and chemical behavior.



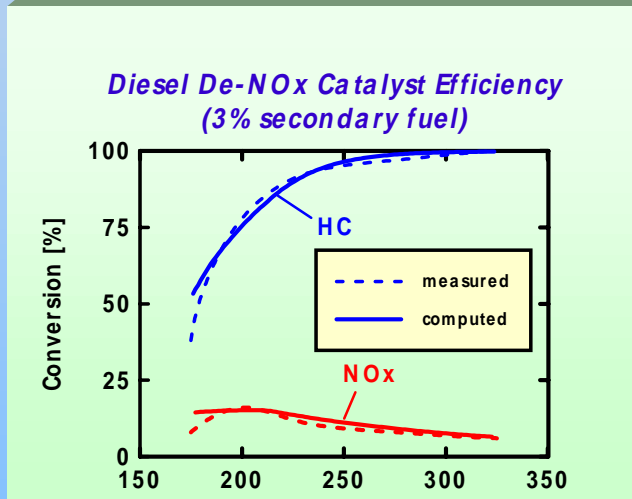
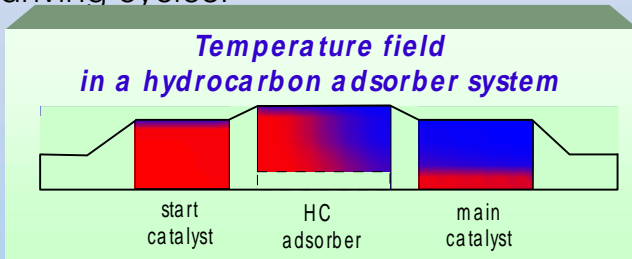
### ➤ *CATRAN Modular Software*

*CATRAN* can be customized to be applicable to a wide range of gasoline, diesel or GDI catalytic converters

- ✓ *3-way Catalytic Converters*
- ✓ *Diesel Oxidation and lean-NO<sub>x</sub> Catalysts*
- ✓ *NO<sub>x</sub> adsorber Catalysts*
- ✓ *Hydrocarbon Adsorbers*

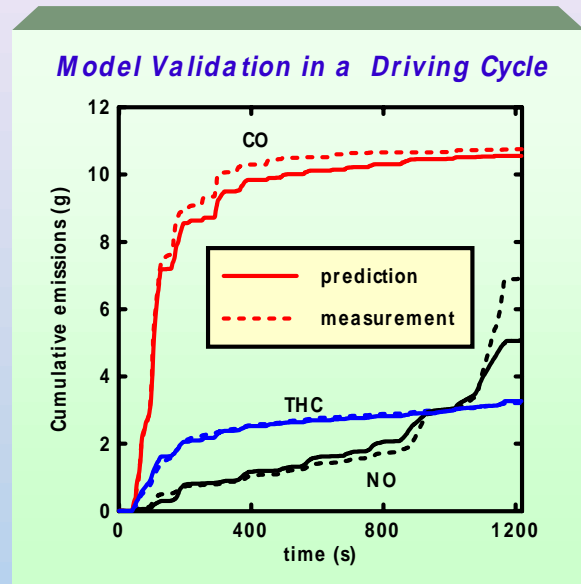
➤ *Almost “Real-Time” running*

Mathematical modeling of the physico-chemical catalyst behavior is an extremely complicated task. Our modeling philosophy identifies and models the dominating phenomena. Extensively validated, which fast simulation of full driving cycles.



➤ *Wide Applicability in Design*

- ✓ sizing & positioning
- ✓ substrate design (cpi, sizing)
- ✓ washcoat selection
- ✓ manifold & piping design
- ✓ close-coupled catalyst design
- ✓ EHC design & management
- ✓ flow pattern effects
- ✓ fuel management optimization
- ✓ On-Board Diagnostics



➤ *Model Tuning approach*

Our modelling is based on simplified reaction schemes and apparent kinetics, with reduced, net reaction rates instead of elementary reactions. This allows successful modelling for a variety of washcoat formulations, fresh and aged. Required input is supplied by standardized tests for model tuning.

