Future Trends for DPF....SCR on-Filter (SCRF)

Micron-Scale Tunable Acicular Mullite

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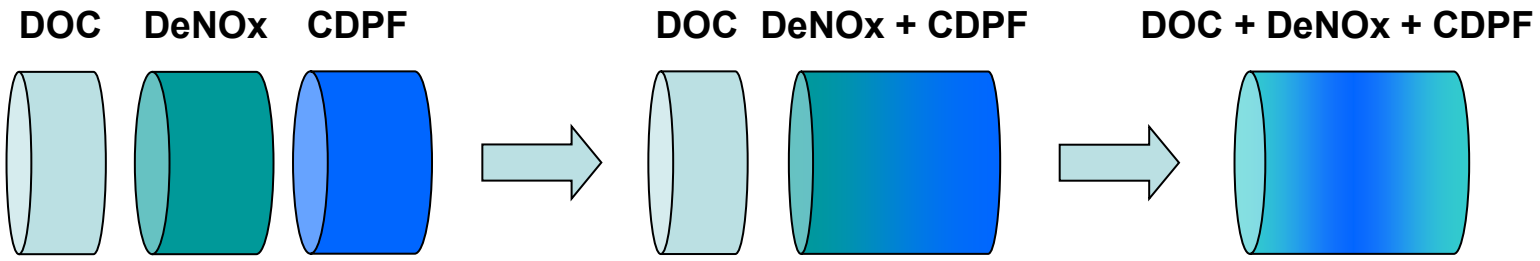
Integrating Filtration and De-NOx Functions



- The promise of multifunctional DPFs (SCRFs):
  - Reduced volume and weight
  - Reduced system cost
  - Reduced system pressure drop
  - Higher working temperatures for catalytic activity
- Key limitation to practical implementation:
  - Excessive filter pressure drop at the high catalyst loads required to meet the DeNOx requirements
- Substrate and catalyst innovations are needed:

Substrate	Catalyst
- High porosity DPF substrates	- Tailored SCR catalysts
- Optimized pore structures	- Porosity and particle size
- High catalyst / Low PD	- Coating distribution
- Excellent filtration behavior	- Catalytic performance
- Robust and durable	- Robust and durable

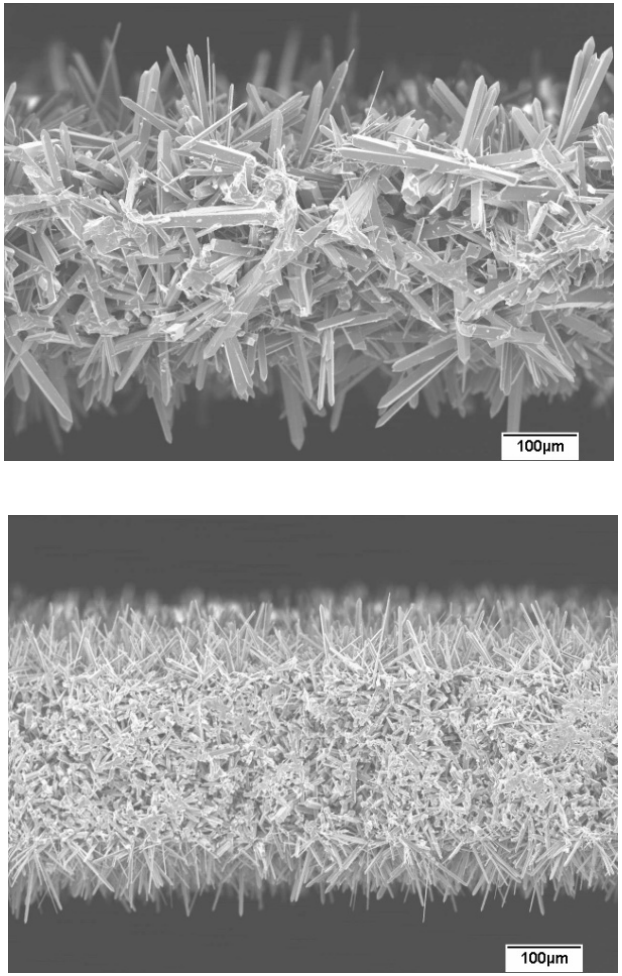
Tailored Substrates for SCRF Applications

DOW Automotive Systems

30 micron

Pore Size

9 micron



80 %

Porosity

50 %

- Dow's ACM process enables tuning of pore size & porosity
- Substrate can be tuned for specific applications, e.g. SCRF
- Opportunity to develop substrate catalyst synergies

- Many emerging applications offer potential for porous ceramic substrates
- Multifunctionality is an emerging opportunity for advanced ceramics
- Integrating functions will require tunability of microstructures
- Dow's acicular mullite ceramics are easily tailored for SCRF
  - In-process porosity & pore size control
  - High porosity, high strength substrates
  - High catalyst loading with low pressure drop
  - High regeneration efficiency
  - Excellent NOx reduction performance
- New mullite-cordierite composite materials are under development
  - Capture advantages of both parent materials
  - Potential next generation of high porosity SCRF products