



Korea Institute of Energy Research

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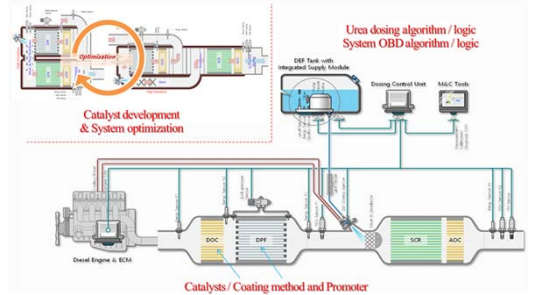
22nd ETH-Conference on Combustion Generated Nanoparticles

Poster Session 6 : Particle Filters

No. 40

Introduction

- 1) Old diesel vehicles are emitting relatively high particle and NOx emissions
- 2) The Ministry of Environment in Korea is trying to reduce the emissions from old diesel vehicle through some policies such as installation support of after-treatment system
- 3) This research is focused on the reduce the BPT of the DPF to 250°C or less through improvement of catalyst coating method and adoption of promoter while lowering the precious metal catalyst coating amount
- 4) Also, control logic for SCR system suitable for DPF with low BPT is developing



Test engine & Methodology

- 1) BPT of DPF
 - Engine operating condition : 2000rpm, EGR off, From 200°C to 300°C
 - The differential pressure of DPF is measured and the temperature without change of the pressure is defined as BPT
- 2) SCR test
 - ANR(Ammonia to NOx ratio), NH3 storage & release characteristics

<Emission analyzer>



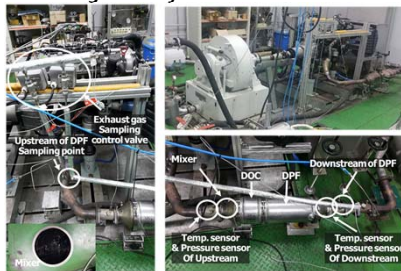
(MEXA 1400QL-NX)

Category	Specifications
Measuring principle	Quantum Cascade Laser Infrared(QCL-IR) 5 spectroscopy
Measuring components	NO, NO2, N2O, NH3
Measuring range	NO : 0 - 5000 ppm NO2 : 0 - 2000 ppm N2O : 0 - 2000 ppm NH3 : 0 - 2000 ppm
Sampling rate	10 Hz
Flow rate	8 L/min

<Test engine specifications>

Item	Specifications
Type	4 Cycle, In-line 5
Aspiration	TCi
Displacement volume (cc)	2696
Bore x Stroke (mm)	86.2 x 92.4
Compression ratio	17.5
Max. Power (PS)	1914,000 rpm
Max. Torque (N. m)	410/3,000 rpm
Emission regulation	Euro 2
After-treatment system	DOC
Model year	2006

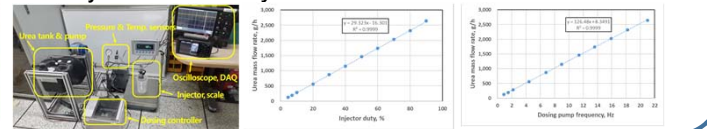
<Test engine & Dynamometer>



<SCR & AOC>

Category	Specifications	Category	Specifications
Substrate	Cordierite	Substrate	Cordierite
Catalyst	V-W / TiO2	Catalyst	Pt, Pd
Cell density	400 cpsi	Cell density	400 cpsi
Diameter	6.77 inch	Diameter	6.77 inch
Length	10 inch	Length	2 inch

<Urea Injection & Control System>

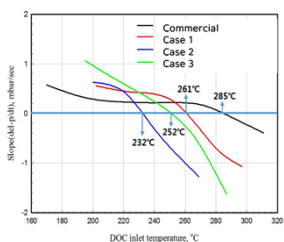


Test results & Conclusion

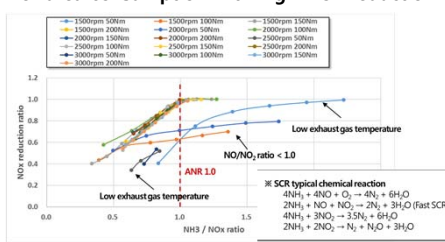
- 1) Achievement of Balance point temperature of DPF below 260°C
 - Verification of availability as a natural regeneration DPF
 - Hereafter study : Continuous study to reduce precious catalyst loading by improving catalyst coating method and promoter

- 2) SCR characteristics at constant speed operation
 - Reduction characteristics by ANR, NH3 storage-release characteristics
 - Hereafter study : Minimization of NH3 slip during transient operation

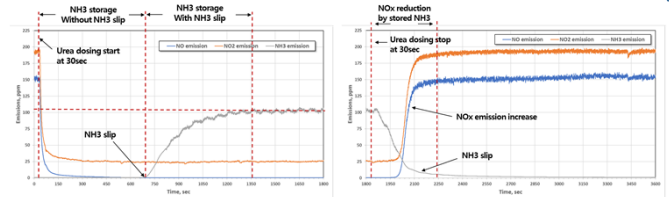
ion of urea consumption with high NOx reduction



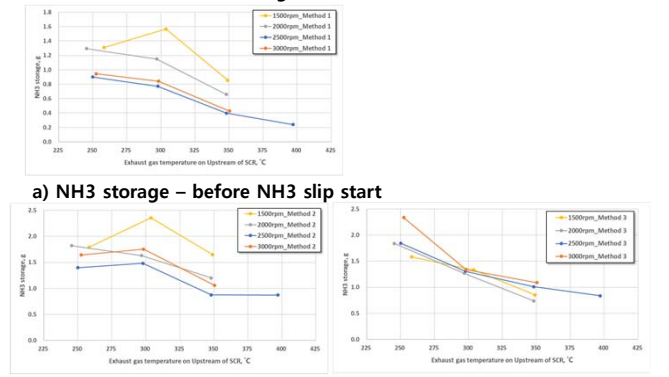
<BPT test results>



<NOx reduction efficiency by ANR>



<NH3 storage-release test method>



b) Total NH3 storage – including NH3 slip period

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