

**Ag/Al<sub>2</sub>O<sub>3</sub>**

**NO<sub>x</sub>**

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**Reactivity for NO<sub>x</sub> Reduction by Ethanol-SCR over Ag/Al<sub>2</sub>O<sub>3</sub> Catalyst**

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NH<sub>3</sub> SCR NH<sub>3</sub> , , slip ,  
CH<sub>4</sub>, C<sub>2</sub>H<sub>5</sub>OH, C<sub>3</sub>H<sub>6</sub>, C<sub>3</sub>H<sub>8</sub> , SO<sub>2</sub>  
· N<sub>2</sub>O [1-5].

NO<sub>x</sub> , honeycomb cell density  
Ag/Al<sub>2</sub>O<sub>3</sub> , SO<sub>2</sub> NO<sub>x</sub>  
SO<sub>2</sub> Ag XPS XRD

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NO<sub>x</sub> Ag/Al<sub>2</sub>O<sub>3</sub> honeycomb  
honeycomb (200 cells/in<sup>2</sup>, 3x3x5 cm) washcoating , slurry cordierite

XPS (VSW ESCA-XPS system, 10 kV, 15  
mA, 2~8x10<sup>-8</sup> mbar, fixed analyzer transmission, Scientific) XRD (D/Max  
2200+Ultima, Cu-Ni, Rigaku) bulk  
SUS-304 honeycomb (3x3x2.5 cm) ,  
CO, NO, NO<sub>2</sub>, O<sub>2</sub>, SO<sub>2</sub>, 가 MFC  
(Lindberg Blue) K ,  
(Lindberg Blue) Solvent delivery pump (M930, ) 가  
EtOH 가 portable gas analyzer (MKII,  
Eurotron) CO, CO<sub>2</sub>, NO, NO<sub>2</sub>, O<sub>2</sub>, SO<sub>2</sub> .

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DN3 (Ag ) SV가 NO<sub>x</sub> ,  
Fig. 1 가 , DN3 NO<sub>x</sub>  
가 가 350~400 . 400

EtOH-SCR                      EtOH                      가 Ag  
 CO<sub>2</sub>    H<sub>2</sub>O  
 SV                      NO<sub>x</sub>  
 SV 20,000 h<sup>-1</sup>                      40,000 h<sup>-1</sup>                      가  
 SV가                      가

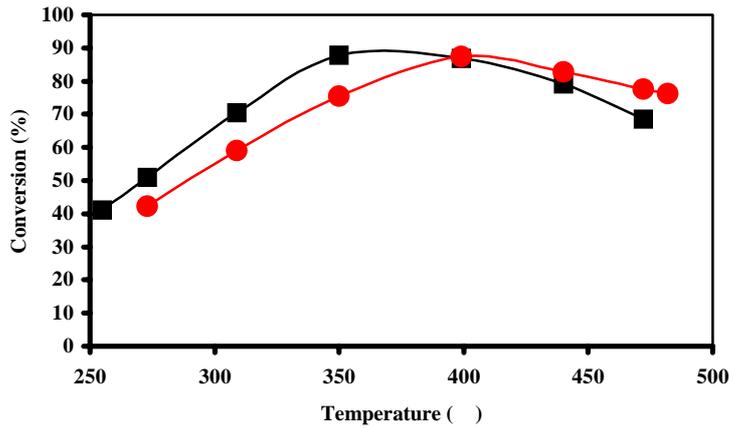


Fig. 1. NO<sub>x</sub> conversion with variation of space velocity and temperature.  
 Reaction condition : Catalyst 3x3x2.5 cm, 200 cells/in<sup>2</sup>, O<sub>2</sub> 10%, H<sub>2</sub>O 5%,  
 NO<sub>x</sub> 200 ppm, CO 400 ppm, SO<sub>x</sub> 0 ppm, EtOH/NO<sub>x</sub> = 3  
 Symbol : SV 20,000 h<sup>-1</sup> (■), SV 40,000 h<sup>-1</sup> (●)

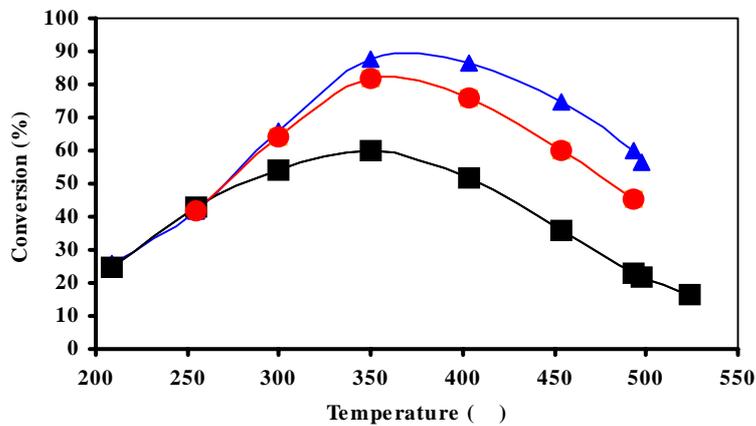


Fig. 2. NO<sub>x</sub> conversion with variation of EtOH/NO<sub>x</sub> ratio and temperature.  
 Reaction condition : Catalyst 3x3x2.5 cm, 200 cells/in<sup>2</sup>, O<sub>2</sub> 10%, H<sub>2</sub>O 5%,  
 NO<sub>x</sub> 200 ppm, CO 400 ppm, SO<sub>x</sub> 0 ppm, SV 20,000 h<sup>-1</sup>  
 Symbol : EtOH/NO<sub>x</sub> = 1 (■), 2 (●) and 3 (▲)

EtOH-SCR                      EtOH/NO<sub>x</sub>                      가 NO<sub>x</sub>  
 Fig. 2                      NO<sub>x</sub>                      EtOH/NO<sub>x</sub>                      가                      가  
 가                      NO<sub>x</sub>                      가                      , Ag                      EtOH

EtOH/NO<sub>x</sub> 가 가 EtOH EtOH-SCR 가 가  
 Ag/Al<sub>2</sub>O<sub>3</sub> NO<sub>2</sub> 가 가 SO<sub>2</sub> 가 DN3  
 EtOH mole ratio 가 가 NO<sub>2</sub> 가 SV 가  
 NO<sub>2</sub> 400 □ NO<sub>2</sub> 70% 가 450 □ DN3-6 SO<sub>2</sub> 가  
 NO<sub>2</sub> SV 30,000 hr<sup>-1</sup> NO<sub>2</sub> DN3 350 □, SO<sub>2</sub> 가 EtOH/NO<sub>x</sub> = 2  
 95% NO<sub>2</sub> 450 □  
 LNG SO<sub>2</sub>가 NO<sub>x</sub> EtOH-SCR 가 SO<sub>2</sub>가 NO  
 SO<sub>2</sub> 가 SO<sub>2</sub> 17 ppm NO<sub>x</sub> Fig. 3  
 450~500 SO<sub>2</sub> 가 가 NO<sub>x</sub>  
 Ag sulfate 500 2 thermal regeneration SO<sub>2</sub>가

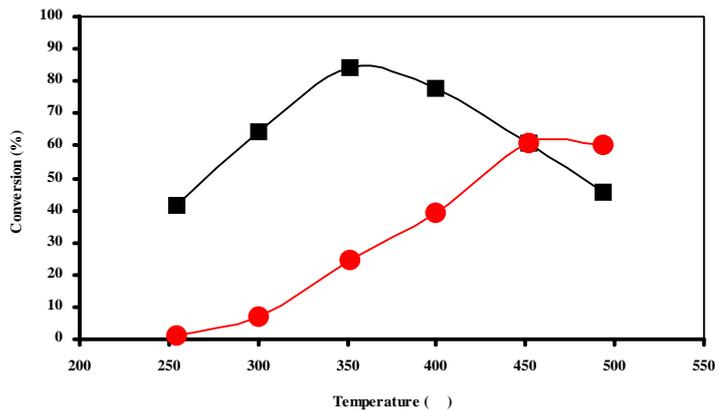


Fig. 3. NO<sub>x</sub> conversion with SO<sub>2</sub> concentration and temperature.  
 Reaction condition : Catalyst 3x3x2.5 cm, 200 cells/in<sup>2</sup>, O<sub>2</sub> 11%, H<sub>2</sub>O 5%,  
 NO<sub>x</sub> 700 ppm, CO 1,400 ppm, SV 20,000 h<sup>-1</sup>  
 Symbol : SO<sub>2</sub> 0 ppm (■), SO<sub>2</sub> 17 ppm (●)

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