

Substitution of Platinum Group Metals and Rare Earths from Automotive Catalytic Converters

MONOLITHOS

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AUTOMOTIVE CATALYTIC CONVERTERS



Ceramic

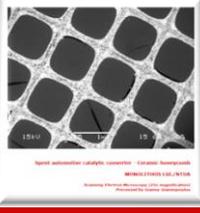
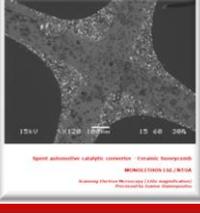


Metallic

The mean automotive catalytic converter consists of:

- ✓ **750 grs of ceramic honeycomb or metal substrate**
- ✓ **30 grs of rare earths**
- ✓ **1.96 grs of Platinum Group Metals**

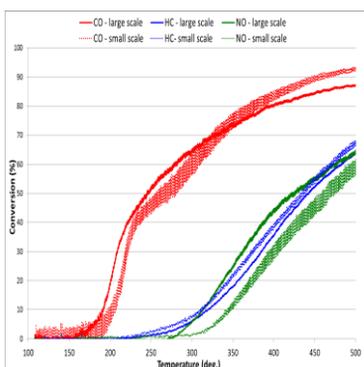
Oxide/Metal	w/w
Ceramic Monolith - Cordierite	
MgO	8,51%
Al ₂ O ₃	37,15%
SiO ₂	35,33%
Poisoning (Lubricants - Fuels)	
NaO	3,07%
P ₂ O ₅	1,81%
CaO	1,16%
Cr ₂ O ₃	0,80%
Fe ₂ O ₃	2,44%
ZnO	0,33%
BaO	0,77%
S	0,44%
C	0,43%
Catalyst Support (Washcoat)	
TiO ₂	0,29%
ZrO ₂	4,55%
La ₂ O ₃	0,29%
CeO ₂	3,51%
Catalyst (Noble Metals)	
Pt	0,1364%
Pd	0,0754%
Rh	0,0275%

NEXT-GENERATION-CATALYST (Project No 280890/NMP.2011.2.2-4)

SCOPE

Partial Replacement of Platinum Group Metals from Automotive Catalytic Converters with transition metal nanoparticles of increased dispersion



Convention of CO/HC/NO using Cu catalyst on Ceria/Zirconia Oxide (total replacement of Platinum Group Metals)

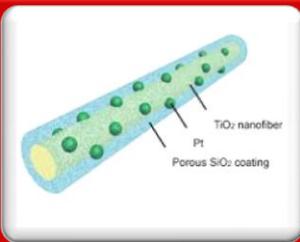
Stage of Development

1. Up-scaling from laboratory level to production of bigger catalyst quantities (i.e. samples of 2kg) has been successfully performed
2. Coating of the new catalyst to small monoliths (15x15mm) for laboratory emissions tests has been successfully performed

Next Steps

1. Coating of commercial monoliths
2. Production of catalysts containing only 15g/ft³ of Platinum Group Metals
3. Laboratory and Real-Life-Conditions Ageing of the new catalyst
4. Homologation of the new catalyst against Euro Emission Standards

INITIATIVE: DEVELOPMENT OF NANO-FIBRES TO REPLACE CERAMIC HONEYCOMB



Nano-fiber



Experimental apparatus for the hypergnation of metals on the catalytic membrane surface



- Alumina, titania or their mixtures as catalytic support
- High porosity permitting gases to present two-axis movement within the catalyst
- High coating flexibility (e.g. oxidation to take place separately than reduction)