

* A catalytic test reaction is performed.

OGULAB.

[Nanospace for Environment Protection, Resource Recovery, and Energy Storage]

Department of Materials and Environmental Science

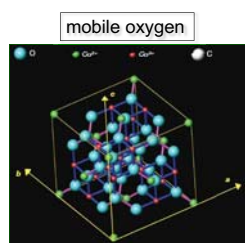
<http://www.ogulab.iis.u-tokyo.ac.jp>

Lab for Environmental Catalyses and Materials Science

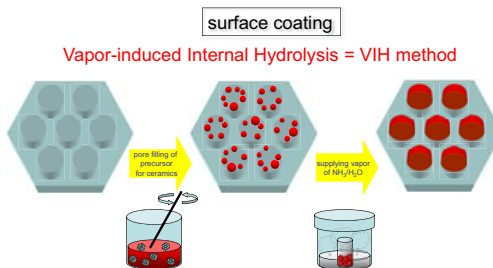
Department of Applied Chemistry

Environmental catalysts

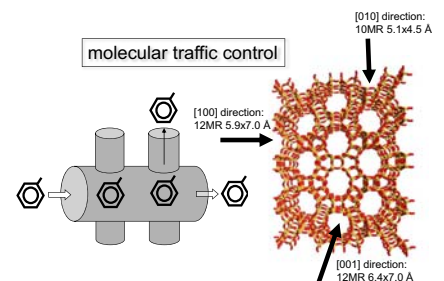
D'où venons-nous? Que sommes-nous? Où allons-nous?



Lattice oxygen of active oxides is activated by surface modification to be used for oxidation.



High surface-area ceramics are successfully prepared on the surface/in confined mesospace.



Exhaust HC at around RT, that is "cold-start" emission, is stored inside micropores and diffuses slowly until TWC becomes active at higher temp.

For gasoline-engine vehicles

Current technologies

requirement
targets in very low concentration
at low-high temperatures
with a long-time durability

the solution
a large amount of precious metals

honeycomb-type catalyst support

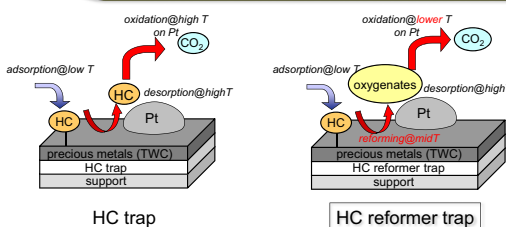
For heavy diesel-engine vehicles

Pt, Rh-based Three-Way Catalyst (TWC)

Pt-based Diesel Oxidation Catalyst (DOC)

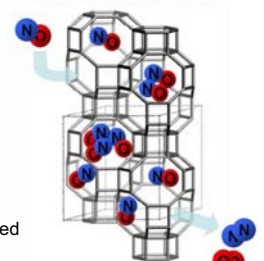
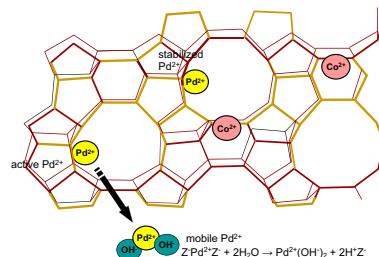
Diesel Particulate Filter (DPF)

NOx storage reduction (NSR), lean NOx trap (LNT) or urea(ammonia) selective catalytic reduction (SCR)



During HC trap, the HC concentrated in micropore is transformed to a more reactive compound to lessen Pt duty.

"Non-porous" sodalite zeolite is used to cite active potassium compound.



Clarke number: O, Si, Al, Fe, Ca, Na, K, Mg, H, Ti, Cl, Mn, P, C, S, N, ...

○: currently used in our lab

H	He																
Li	Be	B	C	N	O	F	Ne										
Na	Mg	Al	Si	P	S	Cl	Ar										
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	L	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra																
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu			
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr			

our proposals

nanospace to concentrate low level targets
 selection in chemisorption
 surface modification to create active species on surface
 stabilization of active species
 ... > achieved by zeolites and nanospace materials