



**XXIVth World
Road Congress
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PHOTOCATALYTIC APPLICATIONS IN BELGIUM, PURIFYING THE AIR THROUGH THE PAVEMENT

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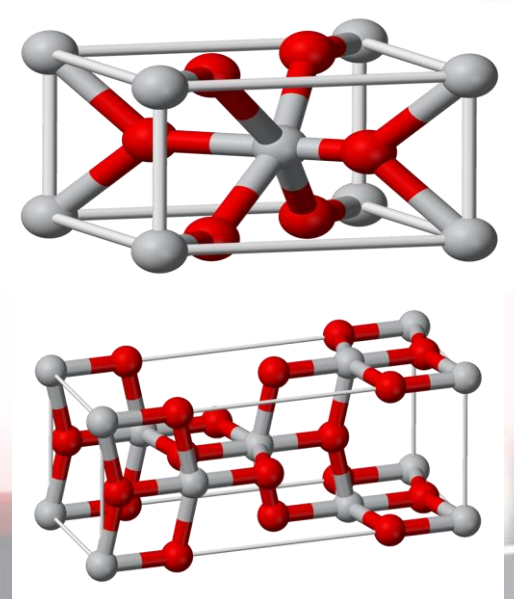
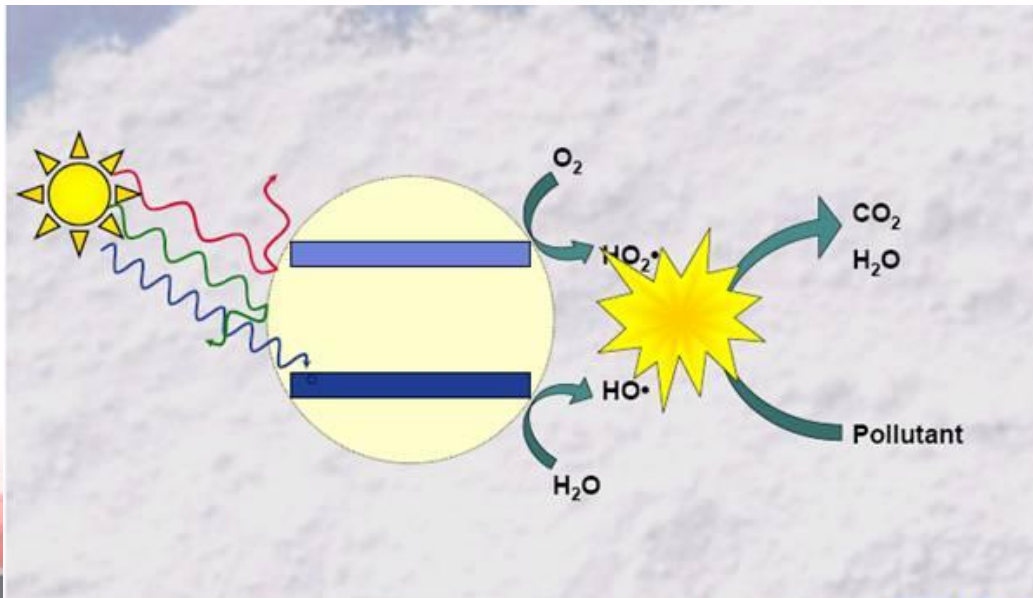
Overview of the presentation

- Heterogeneous photocatalysis, a process for air purification
- Experiences in Belgium
 - Leien in Antwerp
 - PHOTOPAQ – Life+: application in tunnel in Brussels
 - ECO2PROFIT – INTERREG: application in industrial zone in double layered concrete
- Conclusions

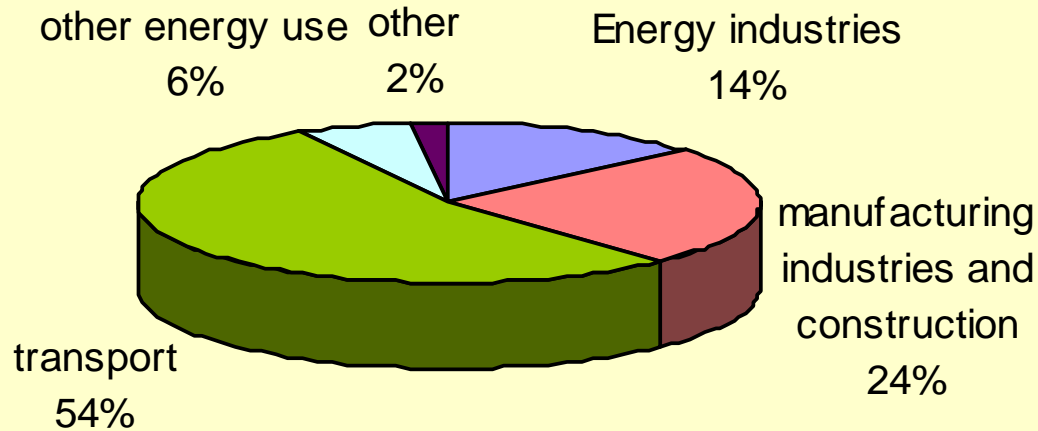


What is heterogeneous photo-catalysis?

- Photo = activation by (UV-) light
- Catalyst: TiO_2 at surface – is not consumed by the reaction
- Heterogeneous: reaction between pollutants in gas form and radicals formed at the surface of the material



Why using photocatalytic materials in road construction?



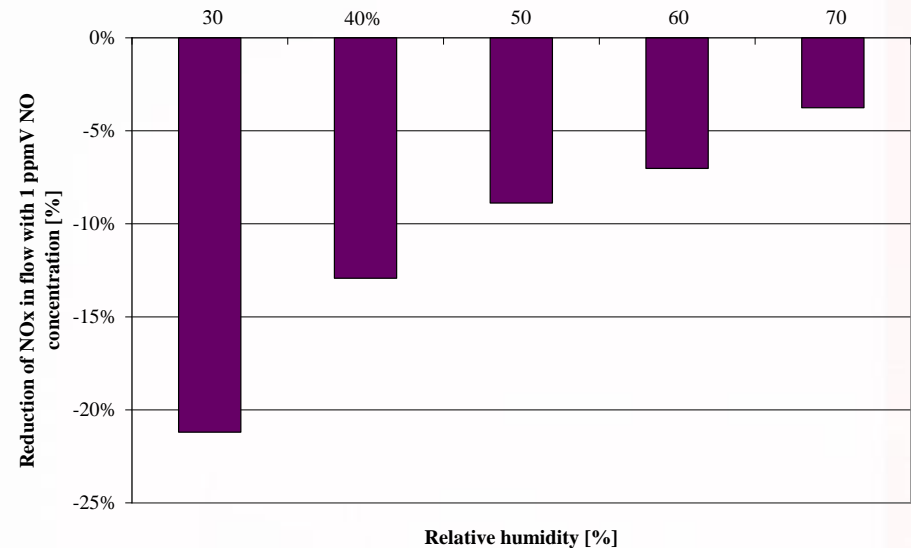
- Traffic: emission of NO_x , VOC and fine particles
- Smog formation
- As close to source as possible



Important parameters for efficiency of reaction

- Relative humidity
- Temperature
- Air velocity...

- Geometry: contact!
- Light intensity
- Rain or water cleaning



Sideways on the “Leien” - Antwerp



- 10.000 m² photocatalytic pavement blocks as pilot project on the parking lanes of a main axe in Antwerp is constructed in 2004-2005
- 2*4.5m on a total width of 60 m!

Photocatalytic activity



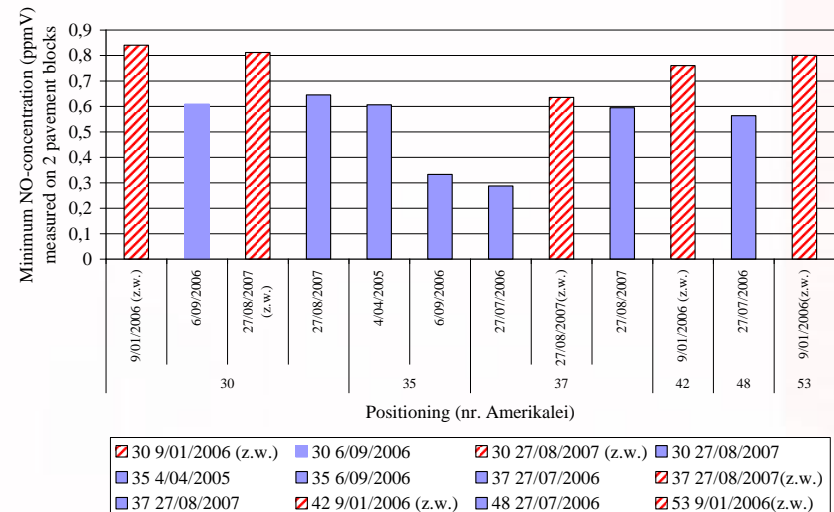
In the laboratory:
on 2 pavement blocks

In the field: air inlet at 5 cm
above the photocatalytic
pavement blocks



Conclusions test side Antwerp

- Durability of efficiency of photocatalytic activity
- Reduction of peakes
- Measurement on site very complex



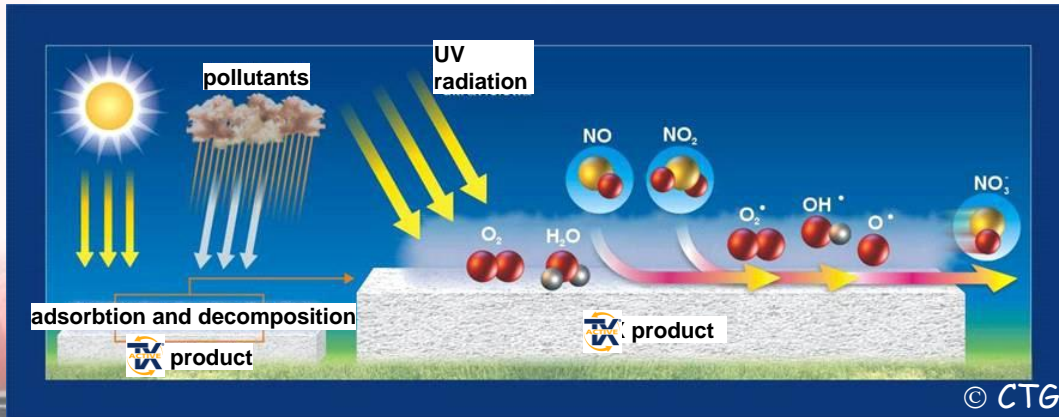
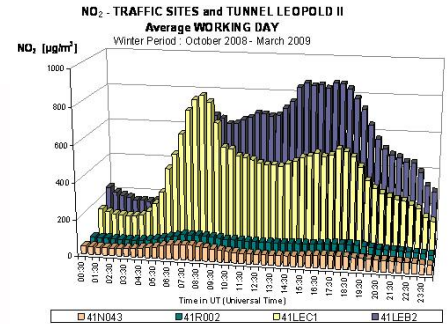
Photocatalytic materials in tunnel in Brussels



- LIFE+ project PHOTOPAQ: application of photocatalytic materials on the walls and roof of the Leopold II tunnel in Brussel with additional UV-light installed



Improving air quality



Tunnel Léopold II : intensive measuring campaign



TEIN TELECOM

LEOPOLD II

Sortie Charles Quint | Entrée Charles Quint | Entrée Basilique | Sortie Basilique | Entrée Saint Anne | Sortie Saint Anne | Entrée Saint-Étienne | Sortie Saint-Étienne | Entrée Yser | Sortie Yser

Local Technique Basilique		Local Technique Simonis		Local Technique Yser	
LEO-ALL-LT1-UL1	UPS	LEO-ALL-LT2-UL1	UPS	LEO-ALL-LT3-UL1	UPS
LEO-ALL-LT1-UL2		LEO-ALL-LT2-UL2		LEO-ALL-LT3-UL2	
LEO-ALL-LT1-UL3	100 %	LEO-ALL-LT2-UL3	100 %	LEO-ALL-LT3-UL3	100 %
Porte avant	Porte arrière	Porte avant	Porte arrière	Porte avant	Porte arrière

Type	Prévu	Date	Code	Origine	Description
0	0	06/10/2010 09:59:46	3003	LEO-ALL-LT3-PLC	Réponse de MIBSON avec PLC *
0	0	06/10/2010 09:59:46	3001	LEO-ALL-LT2-CA-PLC	Réponse de MIBSON avec PLC *
0	0	06/10/2010 09:59:45	3000	LEO-ALL-LT3-PLC	Perte de connexion avec PLC * (Sérialisation = nom du PLC)

Version: 1.0.1.8 | Linté: contrôle connecté | Maintenance: PNC | Révisé par: Kolar Consulting s.r.l. | 06/10/2010 11:09

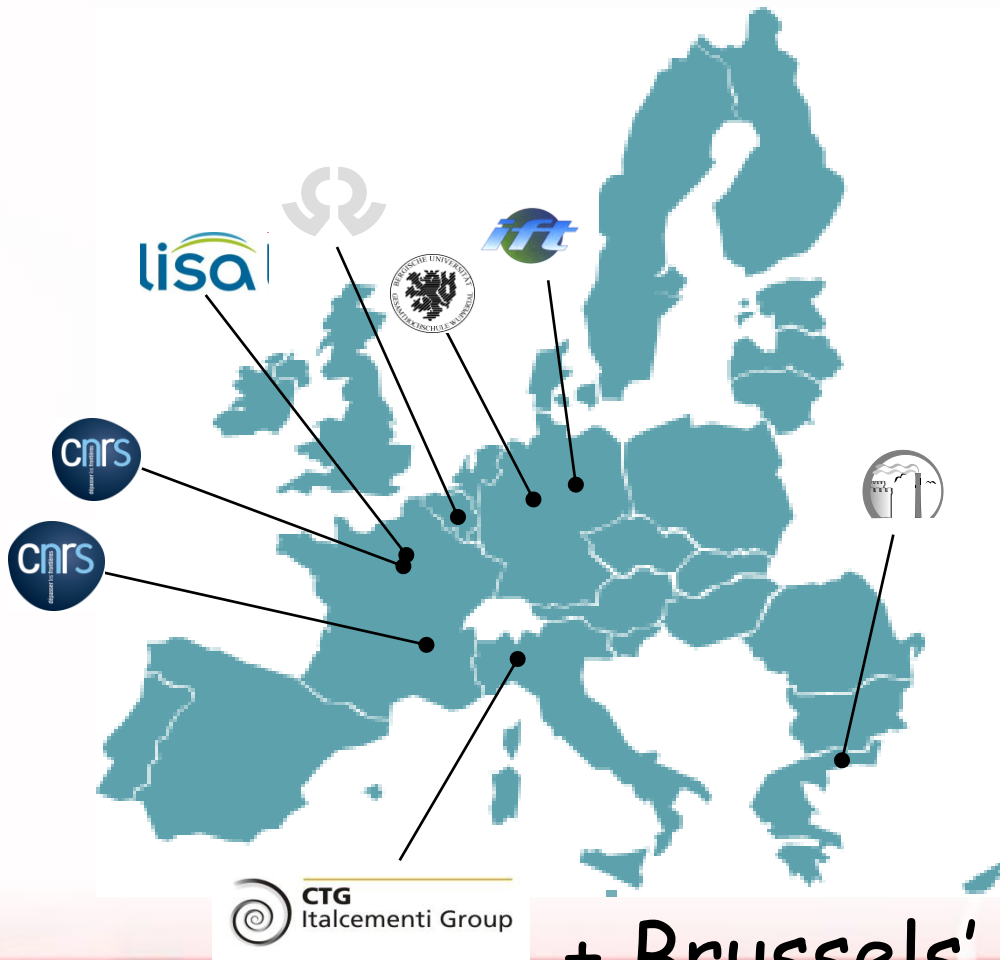
Belgian Road Research Centre



Tunnel Léopold II : field campaign



Photopaq partners



- Institut de recherches sur la catalyse et l'environnement de Lyon**
(Ircelyon, CNRS / Université Claude Bernard Lyon1)
- Institut de combustion, aérothermique, réactivité et environnement**
(ICARE, CNRS)
- Leibniz Institute for Tropospheric Research**
(IFT, Allemagne)
- Bergische University Wuppertal**
(BUW, Allemagne)
- CTG Italcementi Group**
(Italie)
- Laboratory of Heat Transfer and Environmental Engineering**
(LHTEE, Grèce)
- Belgian road research centre**
(BRRC)
- Laboratoire inter-universitaire des systèmes atmosphériques**
(LISA CNRS/Paris Diderot-Paris 7/UPEC).

+ Brussels' Region



ECO2PROFIT – INTERREG project



double layered concrete with recycled concrete aggregates in base layer and photocatalytic concrete in top layer on industrial zone “Den Hoek” in Wijnegem



met de steun van:



Onderstaande partners nemen deel aan het Interreg project eco2profit



Double layered concrete

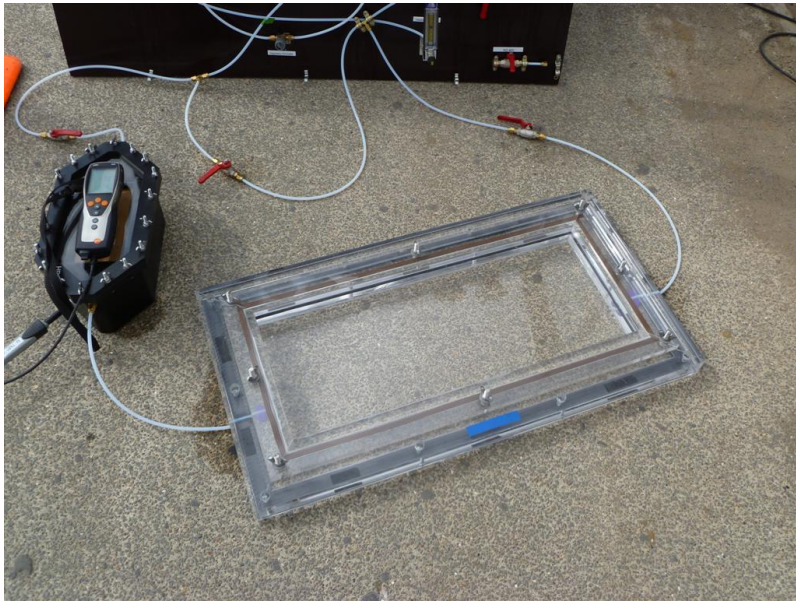


- Wet-in-wet application – excellent adhesion

- Recycled aggregates in base layer
- TiO_2 in top layer

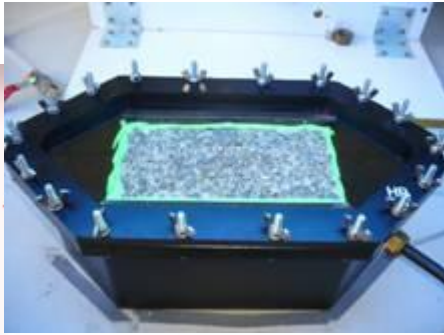


Measurement of influence of different parameters with 'on site' test



- Test results in laboratory of photocatalytic materials are very positive
- Durability of the photocatalytic material is shown by the test site in Antwerp
- Translation to larger on site projects is necessary in order to implement the innovative material
- New applications in Belgium are in testing phase, results are expected by the end of the year





*Thank you for your
kind attention*

