

COST 540 - WG2 Workshop:

"Photocatalytic material standardization: toward CEN/TC386"

Palermo 09 October 2008

Account of the meeting

The people in attendance of the meeting signed the sheet of attendance. Present are most of the invited experts, some of the COST540-WG2 participants, as well as some auditors.

h.9:00: Welcome to the participants and general information on the organization of the day. Prof. Minero asks all the suitable people to fulfill the administrative requirements and to give him the original document for reimbursement. All people were given a copy of the main docs prepared by Dr. Chivot and Dr. Kaluzny that will be reported as attachment to this report.

h.9:10. Prof. Minero opens the Cost540 working group #2 by reading the proposed AGENDA. He outlines that this meeting is a good achievement of the COST-540 action, as this action concluded, with the aim of AFNOR, to the constitution of a technical group inside CEN. This meeting is a preparatory discussion and is expected to give final decisions on the proposal to the CEN/TC386 meeting to be held in Paris, Nov. 5, 2008.

1) Approval of the Agenda.

Prof. Minero asks people if they have to propose modifications to the Agenda. There is a general consensus on the proposed agenda. Thus the agenda is approved.

2) Brief introduction on the main COST540 achievement in the standardization

Dr. Peterka gives a brief presentation of the Cost 540 WG2 activities (meeting in Praha June 2002 among Prof. Bahnemann, Prof. Minero, Dr. Peterka, Prof. Jirkovsky with foundation of an European Discussion Group on Standardization, the COST proposal and its funding on Jan. 2006, also open to non-EU states) and arises some important issues on which the today meeting has to discuss: industry own standards, ISO methods problems, and what are the expectations from CEN. CEN can provide a neutral and independent platform. Several things are to be defined, as CEN deliverables, common vocabulary, the strategy to chose/select standards. He proposes for TC386 a meeting in Praha 20 may 2009, before another meeting on 23-24 May 2009 on %topical meeting focused to standardization on TiO2 photocatalysis , incl. Exhibition of existing testing devices and examples of successful application+.

3) Result of the CEN enquiry concerning the creation of CEN/TC386

Dr. Kaluzny presents the photocatalytic Application Standardization status at CEN, with a brief history and results (activities, industries, a common language, work at ISO and Cost540). Why the creation of CEN/TC? It is and industrial tool, and its scope are to increase the competitiveness in the global market and the consumer protection, to provide more information and to remove poor quality products, to overcome difficulty in visual check.

- 4) **Round Table (with participation of all COST540 Delegates and invited experts, chairman dr. Chivot) with the following topics:**
- **Proposal for the chairman ship**
 - **Title and scope of the CEN/TC386**
 - **Structure proposal (Creation of different working groups)**
 - **Convenorship for the different working groups**
 - **Work programme proposal**

The round table is opened at 10:00. Prof. Minero thanks Dr. Chivot for the technical material he prepared and asks him to chair the Round Table. Today meeting will deal after the presentation of the resolution BTC 033/2008 (attached Doc#1) with the preparation of the first meeting (05 Nov 2008) regarding Title and scope, structure, working program of CEN/TC386.

Dr. Chivot presents the docs he prepared (in Attachment see CEN/TC386 N 00X docs) and chairs the Round Table. He opens the discussion saying that after today discussion he will propose the docs to the delegates of the technical committee CEN/TC386. Dr. Kaluzny insists to have common terminology. Dr. Peterka comments on the importance of today meeting because Prof. Takeuchi will report on this meeting to the Seoul ISO meeting next week.

1. Doc#2. The Draft agenda of the First meeting of CEN/TC 386 **Photocatalysis+** Wednesday 05 of November 2008 - AFNOR . 11 rue de Pressensé . Saint Denis La Plaine . FRANCE is approved.
2. Doc#3. The documents CEN/TC386 N 003 on PHOTOCATALYSIS and its field of application is briefly discussed and approved.
3. Doc #4. This document CEN/TC386 N°004 involves discussion on the CEN/TC 386 Structure. The structure need to be deeply discussed.
 - a. WG1: Terminology. Prof. Palmisano discloses to attendants that an IUPAC glossary of terms on photocatalysis will be published next year. It is highly recommended that this glossary will be followed.
 - b. WG2: Specific topics discussed: on Air purification it is proposed to change to Abatement of organics, inorganics and inactivation of biological activity. It is necessary also to decide the Convenor of the WG and a leader for WG. Dr. Pimpinelli wonders if some proposed WG could be merged. Dr. Bloss and Dr. Chivot think that it will be difficult to organize WG4. To the overall discussion there is participation of Dr. Peterka, Prof. Minero, Dr. Bloss, Dr. Pimpinelli, Dr. Eufinger, Mr. Kato (self cleaning, algae). Also the overall organization is discussed with reference to the existing organization in Japan.
 - c. WG3. Prof. Minero suggests that the topic is not relevant as there are numerous regulations (EU and National) regarding the water quality. In its opinion is important not to develop standards for the water quality, but only to define some molecules for photocatalytic standards. Dr. Chivot reckons that there is obligation to take into consideration ISO standards before. Dr. Eufinger trusts that standards must be non-absorbing near UV-Vis light. Prof. Minero suggests to take into consideration the general characteristic of the water, high/low concentration of DOC and salts, transparent or not, the main limits of proposed standards and their main applications, just to avoid the risk that a positive evaluation by a test could be used outside of what a test could give.

- d. The discussion on the topics to be inserted under the solid surface cleaning title is large. Dr. Kartheuser proposes to branch out the indoor and outdoor environments, as well as the active and passive photocatalytic systems. Dr. Chivot proposes Dr. Bloss to take care of the WG4 organization.

Ore 11:00-11:20 coffee break with personal talks

11:20 continuation of the discussion on Doc#4: On the liaisons with existing standardization bodies prof. Takeuchi reports. He remarks some points at issue further to be discussed: to find dyes best than Methylene Blue, how to evaluate the self cleaning for porous materials, the evaluation of the performance as quantum yield or photonic efficiency, the test methods for air purifiers. He also introduces the Photocatalysis Industrial Association of Japan (PJAI) and the matter there discussed. Some further issues to fix in standardization are the mixed effects (eg TiO_2 and silver), and the definition of the level of light as standard indoor intensity. The report will be put on COST 540 web site.

A further examination of the way the national committee proposals could be merged (DIN, UNI, and AFNOR) is opened. Dr. Peterka asks Dr. Chivot to consider also the point if labs must be independent from industry or not. On some specific questions on the ISO structure, and on the rational for DMSO test for water, Mr. KATO answers. Dr. Lukes replies on the difficulties that some tests could arise on the analytical techniques, and proposes that instead of DMSO it would be better to use terephthalic acid, or the DIN proposal of dichloroacetic acid. Issues to be fixed are: volatility, type of products that can be analyzed (halogens, starting compound, CO_2 , TOC, the need or not of a rapid decomposition rate, the multitest procedures (several compounds with the same analytical technique; Dr. Kartheuser), the possible patents for some standard procedures (Dr. Peterka), the radiation that will be used like UV/Vis or both (Dr. Bloss). On this last issue the attendants agree on to use both.

- e. WG5: all kinds of light sources must be defined. Prof. Minero suggests that this WG has also to consider the evaluation of the best engineering of the photochemical reactor to be used, to clarify the problems related to the light actually absorbed by the photocatalyst.
- f. WG6. New technological applications. This WG opens the door to possible future issues posed by the evolving technology.

According to the present discussion Dr. Chivot will modify the structure of the document. Prof. Minero proposes that a better structure would be a kind of matrix structure on the base of which there are by rows the media (air, water,) and by columns the standardization methods proposed. Dr. Bloss agrees on the picture proposed and adds a third dimension on which there is the application. This would create a 3-dim matrix on which a method could be applied. Further discussion on this topic is needed.

Finally, a discussion is opened on the missed issues and on the need of their standardization. Dr. Peterka asks where medical applications are treated or if there is room inside the proposed structure. Dr. Kaluzny answers that they are under the topic Indoor air or Indoor applications. Dr Bloss poses the question of test for materials used for medical therapy, and Prof. Minero on toxicity of photocatalytic materials and treatments in general, dr Bloss in particular for skin, and Dr. Peterka for paints. Dr. Pimpinelli believes that these problems must be kept out of the TC, because there is no expertise. Prof.

Jirkovsky considers taking into account also the toxicity of intermediates, Prof. Minero in particular on O₃ production from air treatments (especially indoor). Prof. Jirkovsky introduces also the test on toxicity of the reaction mixture, and in this regard Dr. Kartheuser suggests to consider also the selectivity to different by products. Mr. Kato believes that this is an important topic as Japan consumers are more and more requiring answers to their safety. Dr. Pimpinelli considers that there are other regulations dealing with this. There is a general consensus to keep out of this TC the safety and toxicity issues, but with recommendation to insert on each test method the evaluation of intermediates.

Dr. Chivot will modify accordingly to the above discussion all docs before the Paris meeting.

4. Doc#5. Its function is just to take into account the tests by ISO and other standardization bodies. On the review presented the Japanese experts are asked their evaluation and agree on the correctness of the list.
5. Doc#6: the business plan is mandatory for the TC. There is a general consensus on the document. It is proposed to review the graph at page 2 with new data from Japan (Dr. Kato agreed). Dr. Peterka says that Prof. Smith has new data not still released. Dr. Pimpinelli states that he has some figures on concrete paving blocks. It is agreed that all the comments and improvement will be sent by mail to Dr. Chivot. Finally, Dr. Peterka asks how many countries agreed on TC. Dr. Chivot answered and suggested attendants to take contact with their own standardization bodies.

13:10. Stop for Launch

14:30: free discussion on the need of established standards, like NO, NO₂ on some substrates, like concrete and glasses.

15:00: Opening of the afternoon discussion. Dr. Chivot opens again on Doc#6 discussion on established standards by national standardization bodies (see 6.4) and on the need to fix the position of different standardization bodies on the WG here proposed. Dr. Pimpinelli proposed to assess the interest on different WGs. He says that due the structure of UNI there are few people from the Italian side, as well as from Germany as dr. Bloss said, and that delegates from national bodies have to take directly care of defined WGs. Regarding task 1, Prof. Minero opinion on terminology task is that academic people is needed there, because it must to be defined exactly the glossary, i.e. photocatalytic assisted, induced, etc, but also other people is necessary as the properties of the material must be regarded from the customer point of view. As a whole the glossary must be defined more than on the basis of an academic correct definition, but rather on an operational basis. Prof. Palmisano refers to accepted definitions, but agrees on the operational definition of Prof. Minero more than on exact scientific definitions. Prof. Krysa poses the problem of what is an operational definition. Dr. Pimpinelli remarks that some issues are important, like that on terminology, but participation as for other activities arises the problem of financial support. For example in Italy all activities in UNI are supported by privates, with related costs that not always could be supported. In this sense Italian participation to WG2, coating application, and light source WG could

be difficult. In his opinion it is better to increase the number of WG in a second time. In Dr. Chivot opinion it is better to focus on a commercial approach. This means to translate scientific understanding in a commercial marketing document. Dr. Pimpinelli says that his hope is that people will accept as more standard already developed as possible, as well as to take Italian experts in the Italian body to improve actual and future standards. Dr. Bloss depicted the situation at DIN where 20 people are present, but 4-7 are actively working, so the problem to have enough experts is a real problem. For example there was no time to discuss at DIN the huge work done at ISO. Dr. Pimpinelli said that at UNI was the same. The topics relevant at DIN are WG2 (Heidelberg Univ.), particularly on paints and roof tiles. Finally on light sources standardization (Dr. Bloss, Prof. Minero, and Dr. Pimpinelli) there was a general consensus on the need to define a standard for visible light.

The meeting proceeds with a general discussion on proposed Docs. Dr. Chivot asks what is the EU countries position on the proposal of the docs for CEN/TC386. Germany: no discussion. Italy: Dr. Pimpinelli says that at UNI there is a subcommittee of concrete and ceramic, and general interest at academic level, but not a finalized interest. In France there is strong interest for standardization on concrete, no activity of TiO₂ producers, but general availability of experts. The France position is that reported on Figure 1, that the market will be important, and in general there is high attention the to field, as 74 people are present at the mirror committee on photocatalysis+leded by Dr. Chivot.

It is proposed that Dr. Bloss and Dr. Kaluzny will prepare a 3-dim matrix with rooms. They will submit to the national stand bodies for coordinator, members and experts proposal.

It was finally decided that the TC Chairmanship will given to Dr. Kaluzny. He accepted the proposal of Prof. Minero on the change of Title and scope to photocatalytic and photoassisted H_2O_2 and consequently he will change also on the work programme.

Other issues:

Some of the people suggest defining a standardization label to be used on products, with the aim to have both a control on clients as well as their market identification. Dr. Eufinger believes that the two problems (standardization/label) are linked. Other issues to deal with are: a) durability (Dr. Pimpinelli), b) the proper use (Dr. Chivot), c) the preservation of the properties of the materials (Dr. Peterka). Lastly, Prof. Jirkovsky reported on a developed method based on total absorption for evaluation of slurries activities, using monochromatic light, total absorption, CHCl₃ sat. solution at fixed temp, bubbling by O₂, and pH-stat technique.

5) Liaison with ISO/TC206/WG37 (position on the ISO projects)

The position of CEN in ISO is clarified: national bodies will nominate delegates in ISO.

On their function is opened a discussion. Dr. Pimpinelli's opinion is that experts to ISO have to assess that ISO tests work well changing different substrates. In the next meeting in Korea, there will be there 2 France experts. Prof. Minero was indicated by UNI as delegate to ISO, but he will not be present next week for burocratic reasons.

17:00 closing of the round Table

17:00-17:30 Mr Kato reviews using a displayed presentation the PIAJ and its role on Japanese standardization. Among other things there is a PIAJ label, as photocatalytic mark or as a label of quality. The report will be put on the COST 540 web site and given to Dr. Chivot to be used for work program implementation.

6) Any other questions

Nothing relevant.

7) WG2 workshop closing

17:40 Prof. Minero closes the WG2 meeting. He thanks all participants and in particular prof. Palmisano for logistic support in Palermo.

RESOLUTION BTC 033/2008

Subject: Form A . Photocatalysis, Drawing up of terminology, test method and performance standards

BT,

- having considered the Form A submitted by AFNOR (included in BT N 7985)

decides

- to create a new technical committee CEN/TC 384 ~~Photocatalysis~~;
- to allocate the chairmanship and secretariat of CEN/TC 384 ~~Photocatalysis~~ to AFNOR, who agrees to comply with the terms of the CEN Memorandum N_1 as approved by CA 11/1993 and the Rules and conditions for allocation of CEN/TC Secretariat (see Resolution BT 66/2000);
- to ask the new CEN/TC to provide a Business Plan in accordance with the new format as well as a detailed programme of work by 2008-11-30 for approval by BT.

This resolution is applicable as from: 2008-06-11

*Note : The number reference of this technical committee is **CEN/TC386** and not CEN/TC384 as mentioned in the resolution;*

CEN/TC 386 N°002 E

Draft agenda
First meeting of CEN/TC 386 "Photocatalysis"
Wednesday 05 of November 2008
AFNOR – 11 rue de Pressensé – Saint Denis La Plaine - FRANCE

Agenda items

Documents

- 1 Welcoming and opening of the meeting (9.30 a.m)
- 2 Roll call of delegates
- 3 Adoption of the agenda CEN/TC 386 **N 002**
- 4 Appointment of the resolution committee
- 5 Appointment of the Technical Committee Chairman
- 6 Use of languages
- 7 Presentation of the CEN System by CMC
- 8 Technical Committee Business Plan
 - 8.1 Presentation by the Technical Committee Secretary
 - 8.2 Final title and scope of the Technical Committee CEN/TC 386 **N 003***
 - 8.3 Objective and strategy
- 9 CEN/TC 386 « Photocatalysis »
 - 9.1 Organization/Structure CEN/TC 386 **N 004***

9.2 Program of work

9.3 Liaisons ISO/TC206/WG37 and COST 540

CEN/TC 386 **N 005***

10 Preparation of the next meeting (date, venue)

11 Any other business

12 Approval of the last resolutions

13 Closure of the meeting (5 p.m)

*to be circulated with a further dispatch

Title : PHOTOCATALYSIS

Field of application

Photocatalysis is a very efficient advanced oxidation technique which enables the production of hydroxyl radicals OH, capable of partly or wholly mineralising the majority of organic compounds. Its principle is based on the simultaneous action of photons and of a catalytic layer which allows to destroy the molecules. The most commonly used photocatalyst is titanium dioxide (TiO₂), the latter being thermodynamically stable, non toxic and economical. It can be used in powder form in water or deposited on a substrate (glass fibre, fabrics, plates/sheets).

Different applications specific to **photocatalysis** exist in the following sectors:

AIR

- Purification of air.
- Elimination of odours.

WATER

- Purification of water.
- Rendering water suitable for human consumption.
- Detoxication of rinsing water used for agricultural or industrial equipment.
- Discolouration of coloured aqueous effluents (textile industries).

COATINGS

- Application in self-cleaning coatings for surfaces.

glass, metals, concretes, cements, etc...

LIGHT SOURCES

The objective is to introduce performance standards

These standards will mainly concern test and analysis methods.

CEN/TC 386 « PHOTOCATALYSIS »

Structure

WG1 - Terminology

WG2 - AIR Purification

Elimination NOx

Elimination COV and odours

Elimination of Microorganisms

WG3 - WATER Purification

Purification of water

Rendering water suitable for human consumption

Detoxication of rinsing water used for agricultural or industrial equipment

Discolouration of coloured aqueous effluents (textile industries)

WG4 Æ COATING Applications

Ceramics : Project leader

Paints and varnishes : Project leader

Concrete : Project leader

Glass : Project leader (liaison with CEN/TC129/WG6)

Textils

WG5 Æ Light source

WG6 – New technologies Applications

LIAISONS

ISO/TC206/WG37 « Air purification performance of photocatalytic materials (Convenor :
M. Koji TAKEUCHI - Japan)

COST 540 « Photocatalytic technologies and novel nanosurfaces materials - critical
issues » (Chairman : Frantisek DR. PETERKA . Czech Republic)

CEN/TC129/WG6 « Glass in building »

ISO/TC206 Work programme in photocatalysis

ISO/TC206/WG37 « Test methods for photocatalytic materials »

Stage 30 ISO/CD enquiries

ISO/CD 22197-2

E: Fine ceramics (advanced ceramics, advanced technical ceramics) -- Test method for air purification performance of semiconducting photocatalytic materials

Part 2 : Removal of acetaldehyde

ISO/CD 22197-3

E: Fine ceramics (advanced ceramics, advanced technical ceramics) -- Test method for air purification performance of semiconducting photocatalytic materials

Part 3 : Removal of toluene

ISO/CD 10676

E: Fine ceramics (advanced ceramics, advanced technical ceramics) -- Test method for water purification performance of semiconducting photocatalytic materials by measurement of forming ability of active oxygen

ISO/CD 10677

E: Fine ceramics (advanced ceramics, advanced technical ceramics) -- Light source for semiconducting photocatalyst used under ultraviolet

ISO/CD 10678

E: Fine ceramics (advanced ceramics, advanced technical ceramics) - Determination of photocatalytic activity of surfaces in aqueous medium by degradation of methylene blue

Stage 40 - ISO/DIS enquiries

ISO/DIS 27447

E: Fine ceramics (advanced ceramics, advanced technical ceramics) . Test method for antibacterial activity of semiconducting photocatalytic materials

ISO/DIS 27448 partie 1

E: Fine ceramics (advanced ceramics, advanced technical ceramics) . Test method for self-cleaning performance of semiconducting photocatalytic materials

part 1 : Measurement of water contact angle

New Work Items

NP 0809 : Test method for antifungal activity of semiconducting photocatalytic materials

Project leader MORIYAMA Japon

NP 0810 : Test method for air purification performance of semiconducting photocatalytic materials . part 4 : Removal of formaldehyde

Project leader Dr TAKEUCHI Japon

NP 0811 : Test method for air purification performance of semiconducting photocatalytic material . part 5 : Removal of methylmercaptane

Project leader Dr TAKEUCHI Japon

Published standard

ISO 22197 partie 1

F : Céramiques techniques . Méthodes de essai relatives à la performance des matériaux photocatalytiques semi-conducteurs pour la purification de l'air

Partie 1 : Elimination de l'oxyde nitrique

Draft BUSINESS PLAN

CEN/TC386

PHOTOCATALYSIS

1 Scope of the CEN/TC 386

A CEN technical committee has been created (CEN/TC386) with a view to elaborate EN standards in the field of photocatalysis, including laboratory methods, expression of results and accuracy. Standardization of the test and analysis methods used in all fields of application of photocatalysis which are namely air, water, all types of coatings (concretes, cements, paints, glass/glazing, ceramics, textiles, etc.).

2 Market/ environment and objectives of the CEN/TC 386

CEN/TC386 as horizontal CEN/TC, aims at producing general standards to be applied to different elements and building constructions.

As a matter of consequence, stakeholders are manifold, including practitioners, scientists, authorities around Europe and professional bodies, government departments, architects, contractors, designers, construction companies and building materials producers, insulation manufacturers, laboratories.

European organisations in liaison with CEN /TC386:

- CEN/TC352 Nanotechnology+
- CEN/TC129/WG6 Glass in building%
- COST 540 Photocatalytic technologies and novel nanosurfaces materials critical issues+

Market situation

Photocatalysis is a natural phenomenon by which UV radiation, activating a catalyst, induces an oxidation-reduction chemical reaction of pollutants which are thus eliminated. The most commonly used photocatalyst is titanium dioxide (TiO₂), the latter being stable, non toxic, cheap and capable of being used in diverse forms, in particular in powder form in water (destruction of pollutants, pesticides, dyes) with both separation and recycling at the end of treatment, or again in layers deposited on a substrate (glass fibre, fabrics, diverse surfaces, etc.).

There is an increasing number of industrial applications.

- Self-cleaning glazing was one of the first commercialised applications.
- The application on outdoor buildings (glazing, concretes,...) of a submicronic layer coating (therefore invisible) of TiO_2 , rendering their surface "self-cleaning", is becoming more widespread.

Some new applications are beginning to emerge.

- Photocatalytic cements and paints, for example.
- The integration of photocatalysis in space cooling/heating and air conditioning installations is becoming more widespread
- Indoor air cleaner.

For information, the progress of photocatalysis (market size in 2004) is presented in figure N°1. The percentage of photocatalysis market in Japan in 2003 is presented in figure N°2.

Figure N°1 : Progress of photocatalysis (market size in 2004)

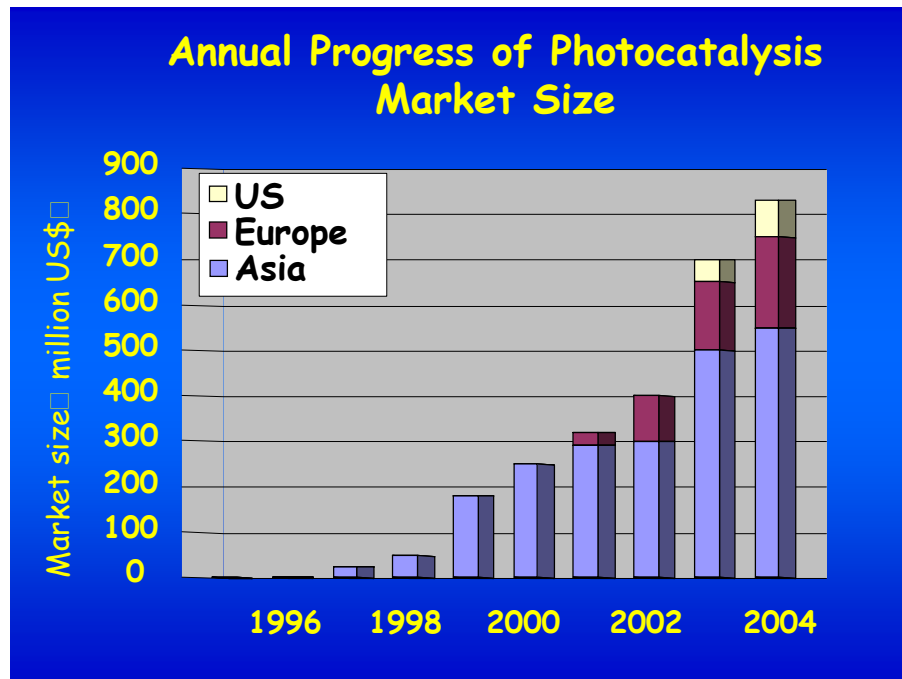
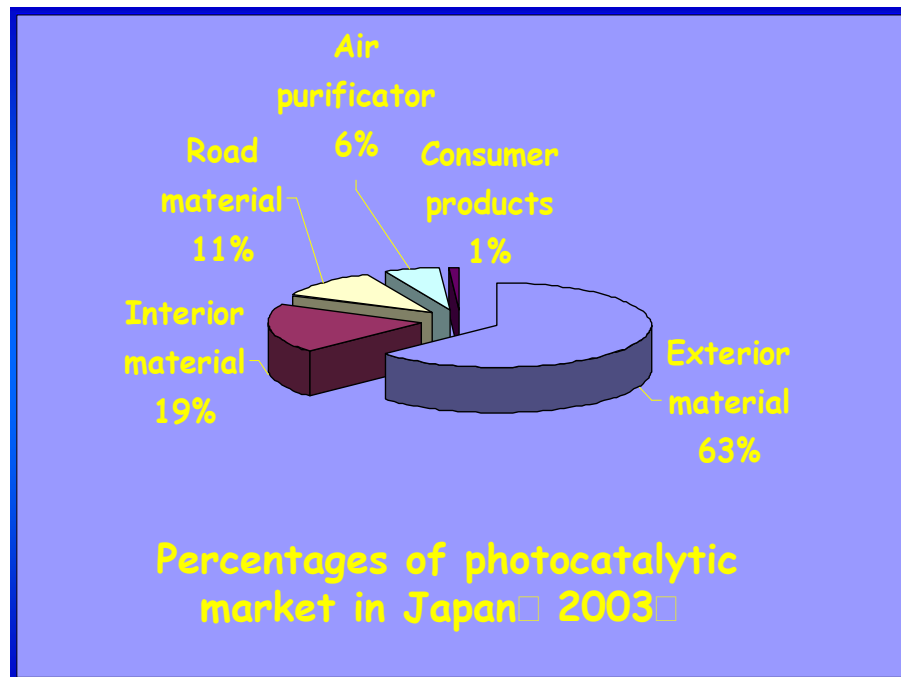


Figure N°2 : Percentage of photocatalysis market in Japan in 2003.



It is also worth noting that the COST 540, set up by the Brussels Research Commission « New photocatalysts and Coatings » gathers together forty or so research workers and industrialists hailing from twelve European countries on the topic « New nano-architectures for photocatalysis in Europe ».

The studies have highlighted the need to define measurement standards relative to the performances of photocatalytic processes.

Objective

In order to respond to the expressed need, a large number of industrialists have proposed to create at European level a « Photocatalysis » Technical Committee responsible for drawing up performance standards in this field.

CEN/TC386 has to provide the stakeholders with general laboratory test methods and single rating procedures so that the products may circulate within the internal European market.

Intervenors (non exhaustive list which may be completed so that all the other interested stakeholders can receive the information at the start of the project.)

- Media producers . Lamp manufacturers/distributors
- Reactor and purifier constructors
- Analysis laboratories
- Industrialists, End-users

- Research and Test laboratories, Technical centres, Research centres

3 CEN/TC386 Structure

Chairman : Pascal DR. KALUZNY . (France)

Secretariat : AFNOR

CEN/TC386/WG1 Í TerminologyÍ

CEN/TC386/WG2 Í Air applicationsÍ

- Purification of air and elimination of odours
- Elimination of micro-organisms

CEN/TC386/WG3 Í Water ApplicationsÍ

- Purification of water
- Rendering water suitable for human consumption
- Detoxication of rinsing water used for agricultural or industrial equipment
- Discolouration of coloured aqueous effluents (textile industries)

CEN/TC386/WG4 Í Application to different coatingsÍ

- Ceramics
- Paints
- Concrete and cements
- Glass
- Textiles

CEN/TC386/WG5 Í Light sourcesÍ

CEN/TC386/WG6 Í New technologies applicationsÍ

Liaisons

☞ Test methods

- ISO/TC206/WG37 «Test method for photocatalytic materials »

☞ Workplace air quality:

- ISO/TC146/SC2 %Air quality . Workplace atmosphere+
- CEN/TC137 %Assessment of workplace exposure+

☞ Indoor air quality:

- ISO/TC146/SC6 %Air quality . Indoor Air+
- CEN/TC264/WG2 %Air quality . Odours+

☞ Water quality:

- CEN/TC164 «Water supply»

☞ Coatings quality

- CEN/TC129/WG6 %Glass in building+

☞ Nanotechnology

- CEN/TC352 « Nanotechnology »

☞ CEN STAR

- COST 540 «Photocatalytic technologies and novel nanosurfaces materials . critical issues+

4 Draft standards currently undergoing enquiry at international level

ISO/TC206/WG37 Í Test methods for photocatalytic materialsÎ

☞ *Preliminary draft standards registered at stage 30*

ISO/CD 22197-2

Fine ceramics (advanced ceramics, advanced technical ceramics) -- Test method for air purification performance of semiconducting photocatalytic materials

Part 2 : Removal of acetaldehyde

ISO/CD 22197-3

Fine ceramics (advanced ceramics, advanced technical ceramics) -- Test method for air purification performance of semiconducting photocatalytic materials

Part 3 : Removal of toluene

ISO/CD 10676

Fine ceramics (advanced ceramics, advanced technical ceramics) -- Test method for water purification performance of semiconducting photocatalytic materials by measurement of forming ability of active oxygen

ISO/CD 10677

Fine ceramics(advanced ceramics, advanced technical ceramics) -- Light source for semiconducting photocatalyst used under ultraviolet

ISO/CD 10678

Fine ceramics (advanced ceramics, advanced technical ceramics) - Determination of photocatalytic activity of surfaces in aqueous medium by degradation of methylene blue

☞ ***Draft standards registered at stage 40***

ISO/DIS 27447

Fine ceramics (advanced ceramics, advanced technical ceramics) . Test method for antibacterial activity of semiconducting photocatalytic materials

ISO/DIS 27448 partie 1

Fine ceramics (advanced ceramics, advanced technical ceramics) . Test method for self-cleaning performance of semiconducting photocatalytic materials

part 1 : Measurement of water contact angle

☞ ***New work items***

NP 0809 : Test method for antifungal activity of semiconducting photocatalytic materials
Project leader MORIYAMA Japon

NP 0810 : Test method for air purification performance of semiconducting photocatalytic materials . part 4 : Removal of formaldehyde

Project leader Dr TAKEUCHI Japon

NP 0811 : Test method for air purification performance of semiconducting photocatalytic material . part 5 : Removal of methylmercaptane

Project leader Dr TAKEUCHI Japon

☞ **Published standard**

ISO 22197 partie 1 (Publication September 2007)

Fine ceramics (advanced technical ceramics) · Test method for air-purification performance of semiconducting photocatalytic materials

Part 1: Removal of nitric oxide

5 National standards dealing with photocatalysis

☞ **Japanese standards:**

JIS R 1701-1:2004

Fine ceramics (advanced ceramics, advanced technical ceramics) -- Test method for air purification performance of photocatalytic materials -- Part 1: Removal of nitric oxide

JIS R 1702:2006

Fine ceramics (advanced ceramics, advanced technical ceramics) -- Test method for antibacterial activity of photocatalytic products under photoirradiation and efficacy

☞ **British standard:**

BS ISO 22197-1

Fine ceramics (advanced ceramics, advanced technical ceramics) - Test method for air-purification performance of semiconducting photocatalytic materials - Removal of nitric oxide

☞ **Italian standards**

UNI 11238-1

Determination of the catalytic degradation of organic micropollutants in air . Part 1: Photocatalytic cementitious materials for use in construction

UNI 11238-2

Determination of the catalytic degradation of organic micropollutants in air . Part 2: Photocatalytic ceramic materials for use in construction

UNI 11247

Determination of the catalytic degradation of nitrogen oxides in air by photocatalytic inorganic materials

UNI 11259

Determination of the photocatalytic activity of hydraulic binders - Rodamina test method".