

**SCIENTIFIC REPORT**  
**COST 540 2<sup>nd</sup> WG3 Meeting**  
**PHOTOCATALYTIC TECHNOLOGIES TO CONSTRUCTION**  
**MATERIALS**

**Florence, Istituto degli Innocenti 08-10 October 2007**

**8<sup>th</sup> and 9<sup>th</sup> October 2007:** All the scientists involved in COST 540 meeting attended the RILEM conference presenting papers in oral and poster forms and discussed fruitfully with other industrial and academic scientists on the application of photocatalysis to construction materials. In particular Dr Peterka during his talk presented COST 540 to the audience (about 150 people).

**10<sup>th</sup> October 2007:**

- 1) 8.40 Dr Peterka introduces the aim of COST 540 and the goals achieved up to date. Moreover he gives information on the previous meetings held in other European countries and informs of the next meeting in Toulouse (France).
- 2) 9.10 Dr B Kartheuser presents the “French Federation of Photocatalysis” (FFP). FFP was created in 2006. It includes today 16 industries and labs research (from producer of the raw materials to end users). He highlights the importance to set up a “quality label” for photocatalytic materials.
- 3) 9.40 Dr A Beeldens presents the methods used in her Research projects for accelerated algae growth, NO<sub>x</sub> removal in laboratory and on site. The importance of pre-treatment of the samples, the influence of the UV intensity and the relative humidity is also highlighted.
- 4) 10.00 Dr F Peterka (and Prof. Palmisano) speak on the role of the light intensity when the light determinations are performed, and in particular the choice of the radiometers should be carefully done.
- 5) 10.30 Dr A. Skapin and Dr V. Ducman present methods for the determination of photocatalytic effects of paintings and coatings. Three methods are discussed: degradation of methylene blue by means of UV/Vis, degradation of gases in gas reactor followed by FTIR investigation and discoloration of pigments applied directly on paintings.
- 6) 11.30 Dr J Kiwi reports the necessity to standardize the nanoparticles deposits in textiles, plastic films and other applications. This standardization applies to TiO<sub>2</sub> and Ag nanoparticles and to the possible toxicity in air and in contact with blood and skin. The standardization of the materials with Ag and TiO<sub>2</sub> nanoparticles refer to the amount of Ag and TiO<sub>2</sub> at the end of the use and to the kinetic performance of the catalyst.
- 7) 11.50. Dr S Pillai presents results concerning the preparation of a special N and F doped anatase photocatalyst prepared at high temperatures (900 °C). The need to obtain this type of anatase is related to the utilization of anatase in the ceramic industry.

- 8) 12.20 Prof. E Selli reports on recent results on Photocatalysis for both degradation of water pollutants and hydrogen production from water splitting. In particular, effects induced by surface modification of TiO<sub>2</sub> photocatalysts by either fluorination or gold nanoparticles deposition on the mechanism of both reactions. A newly set up recirculation system is presented.
- 9) 13.45 Dr J. Jirkovsky informs about methods for the determination of photoactivity of both suspended and immobilized photocatalysts developed in his laboratories. A novel concept of the determination of quantum yields of appropriate photocatalytic degradation systems was introduced.
- 10) 13.40 Eng. L. Guerrini (Italcementi group) informs on the interest by Italcementi for Photocatalysis in building materials, standardization and tests method and antibacterial properties. Currently in Italy standard methods are going to be published on (i) evolution of photoactivity of NO<sub>x</sub> methods (cement based materials and ceramics); (i) evaluation of photoactivity by BTEX method. Italcementi is currently the national coordinator of a transversal working group on Photocatalysis for UNI (National Body for Standardization).
- 11) 14.10 Prof. L. Palmisano shows the photocatalytic reactors both on bench scale and in semipilot scale that have been used last years in his laboratories and highlights that the contact angle measurements for films are a good way to assess the hydrophilic properties of films to standardize them, as pointed out also by Dr Peterka at the start of the meeting. Nevertheless the standardization and the comparison among different photocatalysts is more difficult for aqueous suspended systems. An advice is to compare photocatalysts in photoreactors at equal amount of absorbed photons. The method used up to now in Palermo's laboratories is presented.