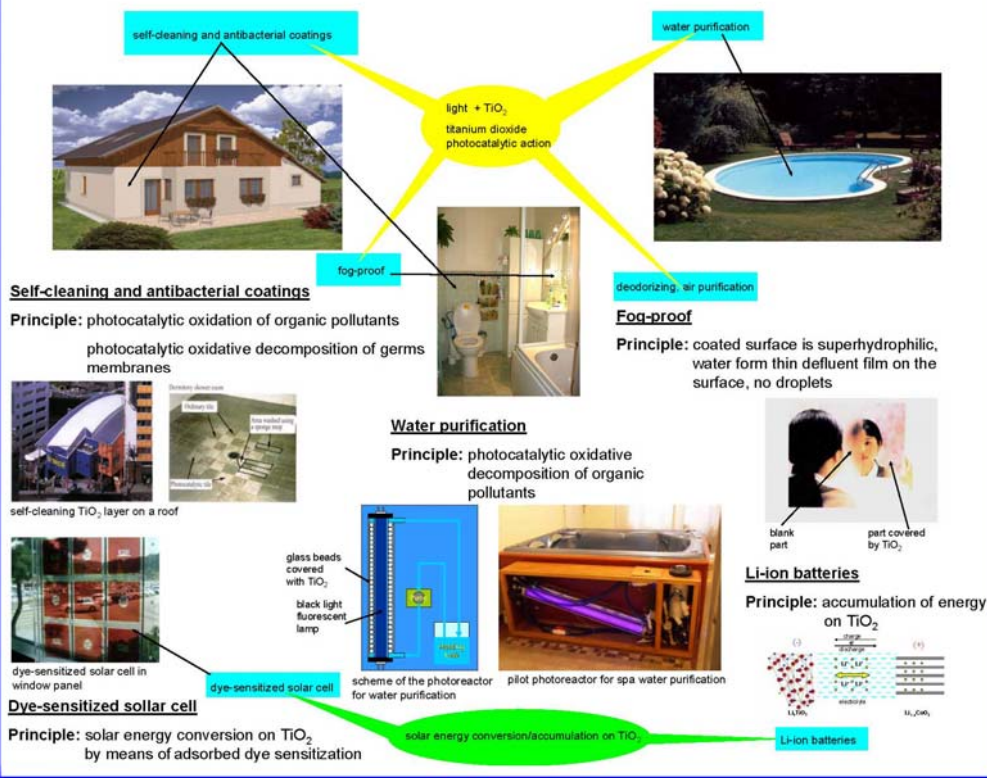


# TiO<sub>2</sub> Based Nanotechnologies for the House of the Future



[www.cost540.com](http://www.cost540.com)

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## PHONASUM

**COST Action 540**

Photocatalytic technologies and novel nanosurfaces materials critical issues

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The Cost Action 540 »**Photocatalytic technologies and novel nanosurfaces materials - critical issues (PHONASUM)**« is a network of researchers and practitioners working in the field of photocatalysis from all around Europe. The main objective of the Action is to increase via a concerted European effort the fundamental knowledge of nanocrystalline photoactive materials and development of new products, which utilize **self sterilizing** and **self cleaning** photoactive materials in specific industrially relevant application fields such as self-cleaning and anti-microbial surfaces, water treatment, air purification and general hygienic applications. The realization of these tasks will be accomplished through the development of novel highly active photocatalytic nanomaterials and coating systems with increased sensitivity in the visible region of the solar spectrum, with high environmental stability and adaptability on the various substrate systems. The Action is also concentrating on the development of **EU standards** for the characterization of photocatalytic materials.

The realization of these tasks will be accomplished through specific objectives of this Action that are summarized as follows:

- Development of novel highly active and resistant nanoparticulate photocatalytic materials sensitive also to the visible light
- Development of technically applicable self aligning photoactive coating systems adaptable to the most common substrates (polymers, glass, ceramics or metals)
- Characterization of physical and chemical properties of photocatalytic nanomaterials and coatings and design of standard photoactivity testing methods
- Utilization of new photocatalytically active nanomaterials and coating systems in specific industrially relevant application fields

The complexity of research on photocatalysis requires co-operation of scientists from various fields including scientists and engineers from physics, chemistry, medicine, materials science and engineering and process engineering, and additionally needs the involvement a number of equipment facilities. In this way, not only the participating groups will benefit directly from this Action, but there will be also considerable input into other research areas indirectly involved in the Action. Training and education activities of young scientists will enhance the development of new skills and expertise in the field of photocatalysis. European academic research integration will achieve also the appropriate critical mass of international partners with very different field of expertise to attain the objectives. The new photoactive nanostructured materials will have ecological, industrial and societal importance and may be developed to be high-added value commercial products and allow the development of innovative enterprises.

The main activity of the Action is divided into 3 Working Groups:

### **WG 1: New Photocatalytically Active Nanomaterials and Coatings**

The main aim of this WG is the preparation of new highly active photocatalytic nanomaterials and coating systems with increased sensitivity in the visible region of the solar spectrum, with high environmental stability and adaptability on the various substrate systems.

### **WG 2: Characterization and Standardization**

The primary aim of this WG is to determine physical and chemical properties of photocatalytic nanomaterials and coating systems prepared in WG1 and design of standard methods of testing of their photocatalytic and superhydrophilic activity.

### **WG 3: Photocatalytic Cleaning and Sterilization Applications**

The aim of this WG is to bring together the newly developed knowledge in WG1-2 and to utilize new photocatalytically active nanomaterials and coating systems and technologies in specific industrially relevant application fields, especially in the areas of self-cleaning surfaces, anti-microbial surfaces, anti-fogging, water treatment, air purification and general hygienic applications. The main focus will be concentrated on the following applications: Medical and Hygienics, Architecture and Interior Applications, Water and Air Purification Applications.

Regarding the standardization aspects this Action is complementary to CEN WG 166, which is looking on **standardization of nanotechnologies**. It is intended to establish close links with the European Committee for Standardization to coordinate the standardization procedures and to ensure the dissemination of the know-how coming from this Action to the whole European standardization community. The Action also benefits from synergies and contacts developed by the 6th Framework Programme Integrated Projects **CONCORDE** devoted to studies on oxide nanostructured catalysts and **FULLSPECTRUM** aiming better exploitation of the solar spectrum in the photovoltaic conversion of the solar energy; **COST Action 529** dealing with development of novel light sources; and by European-Japanese Initiative on Photocatalytic Applications and Commercialisation (**EJIPAC**). There are also national programs, e.g. Finnish National Technology Programme on Surface Sciences **PINTA**, Czech Research Centre for Nanotechnology **NANOPIN** ([www.nanopin.cz](http://www.nanopin.cz)), with which this Action cooperates. As such, this COST Action offers an ideal platform to group the existing collaborations and to allow for a large exchange between the different European groups focusing on the development of photocatalytic nanomaterials and nanotechnologies and their integration for industrial applications. The Action is **open** also to the partners from **non-European countries**.