

LIGHT2CAT is a R&D project funded by the European Union's FP7 programme which aims at developing visible-light sensitive materials to be incorporated into cementitious structures.

The **Light<sup>2</sup>CAT project (Visible Light Active Photocatalytic Concrete for Air Pollution Treatment)** has been granted FP7 EU funds to develop a new class of photocatalytic materials that will be incorporated in concrete structures, enabling the creation of buildings and public infrastructures that, during their life-time, will contribute to the reduction of the concentration of air pollutants in the European cities. The concept of **Light<sup>2</sup>CAT** is to develop new, and highly efficient titanium oxide-based (TiO<sub>2</sub>) materials as the active substance for inclusion in concrete. When the sunlight hits TiO<sub>2</sub>, a cascade of reactions is triggered which, in the presence of atmospheric oxygen and water, eventually leads to the reduction of the concentration of air pollutants. The air pollutants of highest concern for the citizens health are the oxides of nitrogen (NO<sub>x</sub>), sulphur dioxide (SO<sub>2</sub>), ammonia (NH<sub>3</sub>) and volatile organic compounds (VOC). The use of TiO<sub>2</sub> as a photocatalyst in concrete materials is a proven technology tested in several buildings and public infrastructures in Europe. Commercially available photocatalytic concrete usually contain ordinary TiO<sub>2</sub>, a material that is activated only by the ultraviolet (UV) portion of the solar radiation. When used in outdoor applications for depollution purposes, only the small fraction of UV light in the sunlight radiation reaching the Earth surface, i.e. 0.5% in average of the total sunlight, is able to activate the photocatalyst. For such as concern indoor applications, ordinary TiO<sub>2</sub>-based products already on the market display extremely low efficiencies since UV radiation sources are not present and normal illumination cannot efficiently support photocatalytic reactions. Light<sup>2</sup>CAT intends to further push the limits of this technology, tweaking the properties of TiO<sub>2</sub> with the aim of generating a photocatalyst that is effective also in Northern European Countries and in indoor application. The key to achieve this goal is to produce a material that is sensitive to *visible light*. Therefore, to date the environmental benefits of using photocatalytic concrete have not been possible either indoors or outside of the Mediterranean countries because existing photocatalytic concrete does not perform well in conditions of low sunlight or under Northern skies.

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Light2cat will be implemented by a partnership including research institutions, large industries, small-medium enterprises and governmental authorities involved in public infrastructure planning, construction and maintenance. The following list of partners is involved in Light2CAT:

1. Danish Technological Institute, Concrete Centre; Research - Technological Institute of Construction (DK);
2. Dansk Autoværn; SME – manufacturer of concrete structures for roads and motorways (DK);
3. Hermo Prefabricados de Hormigón, HPH; SME – concrete blocks manufacturer (ES);
4. Starka Betong Industrier; SME – paving block manufacturer (SE);
5. Innova; SME - innovation technology consultancy company (IT);
6. CEMENTA (HeidelbergCement Group); Corporate – cement manufacturer (SE);
7. Huntsman Tioxide Pigments; Corporate – manufacturer of TiO<sub>2</sub> (UK);
8. University of Aberdeen; Academic (UK);
9. Aidico; Research – Technological Institute of Construction (ES);
10. Copenhagen City Council; Government Institution – Copenhagen Municipality (DK);
11. Fundación de la Comunitat Valenciana para la Promoción Estratégica, el Desarrollo y la Innovación Urbana (InnDEA), IDEA; Government Institution – Foundation for Urban Innovation of the Municipality of Valencia (ES);
12. Danish Road Directorate; Government institution – Danish roads and motorways agency (DK)



KØBENHAVNS KOMMUNE



Project details

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For further info:  
[www.light2cat.eu](http://www.light2cat.eu)

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