

CERAMIC TILES SURFACE FUNCTIONALISATION BY PHOTOVOLTAIC CELLS

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Abstract

Within Italian Ceramic Centre since 3 years ago a project was carried out to study and develop building ceramics having a functional surface. The objective of the project was to offer technical assistance and continuous support not only to the Emilia-Romagna Region ceramic tiles producers, but also to other Italian and foreign producers, so enabling them to master the fabrication technologies of final products with high added value.

The aim was both to meet the ceramic tiles manufactures needs and to get the hang of new products that, even maintaining their aesthetic and functional characteristics, have new function, e.g. self-cleaning, fotoactive, antibacterial, catalytic, etc.

Initially, the project activities have been directed towards the development of outdoor wall ceramic tiles having the surface able to convert the solar energy into electric one by exploiting photovoltaic effect. Moreover, such tiles maintain their basic role of building thermal insulation since are used as buildings cladding.

Research at Italian Ceramic Centre involves:

- (1) the development of materials suitable to act as photovoltaic cells to be integrated onto the ceramic tiles surface;
- (2) the development of a technology to produce layers, enabling to transform sunlight into electrical power, that can be integrated into the actual production process of ceramic tiles,;
- (3) the development of guidelines for the use of “photovoltaic” tiles for buildings cladding.

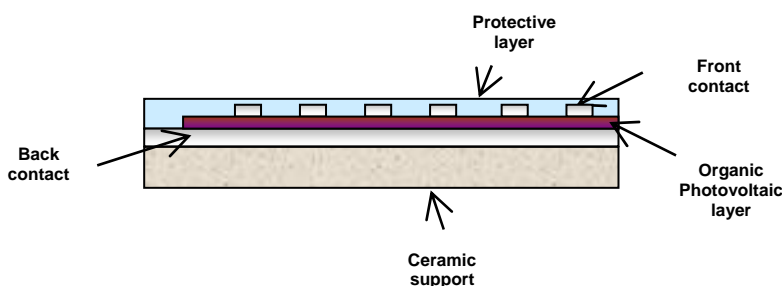
The transfer of the developed technologies to ceramic tiles manufacturers will provide them with new opportunities for products diversification.

Planned Future Research Activities

We would investigate solutions implying the use of organic solar cells.

The main industrial objectives of the research are:

1. development of nanostructured organic materials and of their production technology;
2. design, realisation, characterisation and functional measurements of PV devices, made of the previously developed materials.
3. development of an efficient and cost effective manufacturing technology of prototypal ceramic products with PV devices integrated on their surface;
4. evaluation of the industrial production cost-effectiveness by testing the prototypes production technologies within actual and/or purposely equipped industrial plants.



Scheme of photovoltaic ceramic tile