CSIC has developed a thermochromic mortar coating with optical properties in the solar radiation range that vary according to temperature in a reversible way. The mortar is especially interesting for energy efficiency in buildings. Its solar radiation absorption at low temperatures is high, helping to maintain indoor heating, while its reflectance increases during the summer, reducing over-warming of the envelope.

Industrial partners from the construction industry are being sought to collaborate through a patent licence agreement.

An offer for Patent Licensing

Optical properties changing with temperature

The surface temperature in materials exposed to solar radiation depends on their optical response, increasing for higher absorption of radiation. The optical properties of thermochromic materials change according to temperature. This fact makes them interesting, from an energetic point of view, for building coating since they grant a dark-coloured opaque material (heat absorption) in winter-time and a light-coloured (solar radiation reflection) in summer-time.

The developed technology is a mortar coating with reversible thermochromic properties, based on a light-coloured cement that may be a conventional white Portland cement. However, an alternative proposal is an eco-efficient cement manufactured by hydrothermal synthesis from residues (flying ashes from thermal power plants). In order to achieve its thermochromic functionality, microencapsulated organic pigments are added to the mortar. These substances change colour from dark to light when they are heated over their activation temperature and they recover their original tone when cooled.

Main innovations and advantages

- Thermochromic façade finish without an additional paint layer.
- Use of solar energy to reduce energy demand in buildings.
- In compliance with UNE-EN 998-1:2010 for mortar coatings.
- Different colours and transition temperatures available.
- Reuse of industrial residues, lower energetic consumption and CO₂ emission during cement synthesis, reducing manufacturing costs.

Patent Status
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