Looking to light highways with light-emitting cement

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Light-emitting cement

In order to light roads, highways or bicycle lanes without electricity, Ph.D. José Carlos Rubio, from Michoacan's University of San Nicolas Hidalgo, UMSNH in Spanish, created a light-emitting cement that has a lifespan of 100 years.

"Nine years ago, when I started the project, I realized there was nothing similar worldwide, and so I started to work on it. The main issue was that cement is an opaque body that doesn't allow the pass of light to its interior," said Dr. Rubio.

He explained that common cement is a dust that when it's added to

water, it dissolves as an effervescent pill. "In that moment, it starts to become a gel, similar to the one used for hair styling, but much stronger and resistant; at the same time, crystal flakes are formed—these are unwanted sub-products in hardened cement."

To address this issue, the researcher focused on modifying the micro-structure of the cement in order to eliminate crystals and make it gel completely, helping it to absorb solar energy and return it to the environment as light.

Rubio said that in 2015, global cement production was about 4 billion tons. This is where this new material can find a wide commercial market. During the day, any building, road, highway or structure made out of this new cement can absorb solar energy and emit it during the night for around 12 hours.

Rubio detailed that most fluorescent materials are made out of plastic and have an average of three years of life because they decay over time with exposure to UV rays; this new cement is sun resistant and has an estimated lifespan of 100 years.

Furthermore, it is ecological because the gel is made out of sand, dust or clay, and during manufacture, the only residue is water steam. Currently, it exists in blue or green color, and the light intensity can be regulated to avoid dazzling drivers or cyclists.

This Mexican project has inspired other countries to pursue this line of research. "Due to this patent (the first one for this university), others have surfaced worldwide. In the U.K., we received recognition from the Newton fund, given by the Royal Engineering Academy of London, which chooses global success cases in technology and entrepreneurship."

Currently, this research is in its transfer and commercialization stage. Its inclusion in plaster and other construction products is also being developed.

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