THE NEW REVOLUTION. NANOSTRUCTURED HYBRID PIGMENTS

TECNOLOGÍA PATENTADA

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RESUMEN

A Spanish research group from the University of Alicante, inspired from an ancient technique production of pigments by the Mayan Civilization, has developed a new method to produce a novel kind of nanopigments, bringing together the best of two worlds in a sophisticated way: inorganic and organic materials interacting at the nanoscale.

These nanopigments requires a low energy input for its production, the raw materials are easily available, they are non-toxic, and presents an outstanding resistance to heat, ultraviolet radiation, oxygen and other environmental agents, when compared with other organic coloring alternatives. These pigments produce a wide range of colors that can be precisely tuned and are more intense than the currently used. The research group is looking for companies interested in acquiring this technology for its commercial exploitation.



DESCRIPCIÓN TÉCNICA

A hybrid pigment is a controlled mixture between an inorganic host and an organic guest.

The inorganic material could be chosen from different types of clays with unique morphological and size distribution features, depending on the mechanical, optical or barrier properties for the intended application. As organic material, the component that is responsible to impart colour, a rich spectrum of natural or synthetic dyes can be used, besides, it is possible to use functional dyes to achieve thermochromic, electrochromic, luminescence and other special features.

The research group has developed a new method to produce nanostructured hybrid pigments with specific optical and colloidal properties according to the synthesis parameters. This method comprises two steps:

1) Dispersion of, at least, one inorganic material;

2) Addition of, at least, one organic dye.

The following parameters might be changed in order to obtain different kinds of nanopigments:

- Inorganic material concentration
- Organic dye concentration
- pH
- Temperature
- Ionic strength

The optical response of nanopigments changes according to the particle size distribution and structure of the inorganic material (or materials) dispersion.

VENTAJAS Y ASPECTOS INNOVADORES

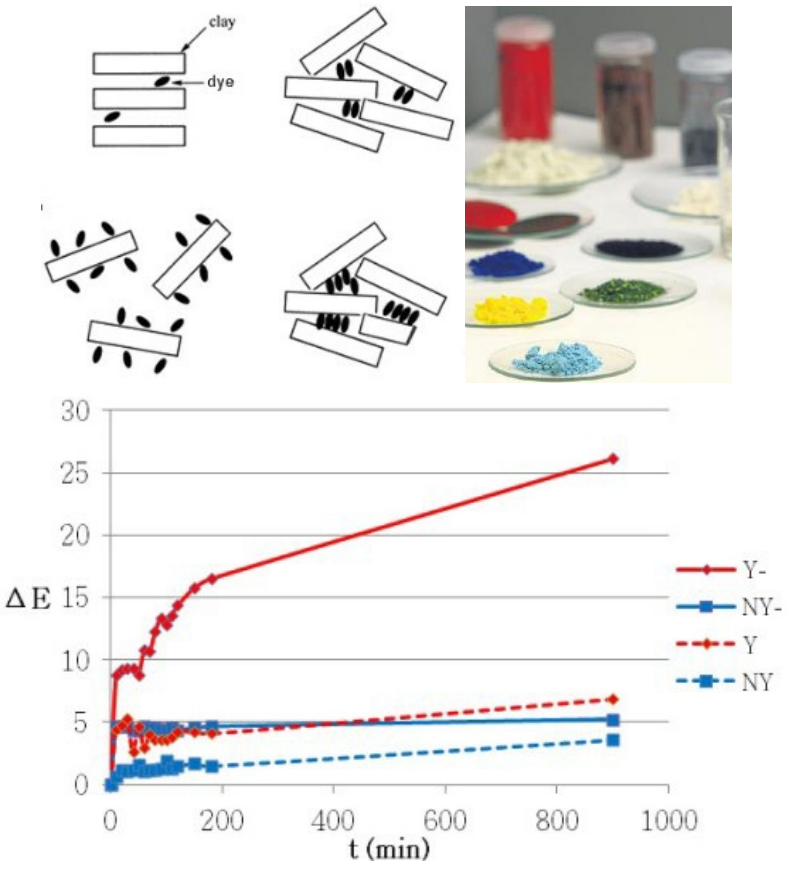
This method makes it possible to produce new hybrid nanopigments with optical and colloidal properties for different applications.

The main advantages are:

- The synthesis process is not complex and it can be easily scaled to industrial production.
- The production method usually works at room temperature (below 200ºC).
- The nanopigments produced by this method does not require a high energy input.
- The raw materials are inexpensive and easily available in the market.
- The nanopigments are heavy-metals free, unlike conventional pigments.
- These nanopigments are non-toxic and environmental friendly.
- These nanopigments provide a wide range of intense colors which are stable to heat, ultraviolet radiation, oxygen and other environmental agents.
- These nanopigments provide a homogeneous coloration to the substrate.

ESTADO ACTUAL

Development phase: laboratory tested.



Picture: nanostructured hybrid pigments synthesized in the laboratory

APLICACIONES DE LA OFERTA

Hybrid nanopigments can be presented as a powder or dispersed in a polar or non-polar liquid solvents for application in several industrial sectors, such as:

- Energy:
  - Solar energy
  - Photovoltaic solar

Other solar

- Consumer related:
  - Clothing, shoes and accessories (including jewellery)
  - Health and beauty aids
  - Home furnishing and housewares
  - Furnishing and Furniture
  - Automobile parts
  - Mobile homes
  - Other consumer products

- Industrial products:
  - Fibre-reinforced (plastic) composites
  - Other fabricated plastics
  - Coatings and adhesives manufactures
  - Speciality/performance materials: producers and fabricators
  - Ceramics
  - Other speciality materials
  - Polymer (plastics) materials
  - Speciality/performance chemicals
  - Electronic chemicals
  - Other speciality chemicals
  - Chemical and solid material recycling

- Other:
  - Pharmaceutical products and cosmetics.
  - Office furniture and other professional furnishings.
  - Textiles (synthetic and natural).
  - Books, cards and other publishing.
  - Packing products and systems.
  - Printing and binding.
  - Other manufacturing.

COLABORACIÓN BUSCADA

The research group is looking for companies interested in acquiring this technology for its commercial exploitation.

- Type of partner sought: private companies.
- Specific area of activity of the partner: production and/or commercialization of pigments for several industrial sector applications.
- Task to be performed: acquire technology for its commercial exploitation. The research group is also open to other kind of collaboration (for example: R&D new applications of this technology in other fields).

DERECHOS DE PROPIEDAD INTELECTUAL

This technology is protected by patent application:

- Application number: P201200078
- Application date: 27th January 2012

SECTORES DE APLICACIÓN (8)

Agri-food and Fisheries
Footwear and Textile
Pharmacology, Cosmetics and Ophthalmology
Toys
Wood and Furniture
Materials and Nanotechnology
Stone and Marble
Chemical Technology