Efficient photocatalyst material for application on flexible plastics as labels

DESCRIPTION OF THE TECHNOLOGY

In recent years, one of the most promising lines of research is the field of plasmonics due to the large number of technological applications. Plasmonics is based on the excitation of surface plasmons produced on the surface of micro- and nanoparticles of noble metals such as Au and Ag.

Normally, the fabrication and deposition of these nanoparticles requires high temperatures to carry out both the evaporation of solvents and the necessary chemical reactions.

One of the problems associated with this synthesis method is that it prevents the manufacture of these materials on flexible plastics such as labels, and with high reaction times, limiting their integration into industrial manufacturing processes.

Researchers at the Universitat de València have developed a new nanometric coating for use as a photocatalyst in the ultrafast synthesis of nanoparticles embedded inside organic polymers and metal oxides by exposure to ultraviolet light.

The coating is made from a solution of metal oxides and its thin film deposition is able to absorb UV light (curing) and photocatalyse solid state reactions, with exposure times of seconds with excellent reaction yields and outstanding adhesion properties.

Contrary to what is commonly used by the scientific community, the metal oxide layer does not require any pre-treatment such as heating for its activation as a photocatalyst as it is produced during the deposition process and at room temperature.

These characteristics allow the fabrication of metal nanoparticles forming the nanometric coating on flexible plastic substrates such as self-adhesive labels, significantly reducing manufacturing times.

MARKET APPLICATION SECTORS

The fabrication and deposition of both metal, semiconductor and insulator nanomaterials in thin-film form have countless uses in industrial processes and multifunctional devices with applications in catalysis, sensing, biotechnology, photovoltaics, optoelectronics, photonics and microelectronics.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The described procedure has the following advantages:

- Speed: Improvement of the time needed to prepare the materials.
- Reduced investment cost: Lower cost of the equipment necessary to apply the procedure.
- Printing on flexible plastic materials and room temperature for the process.

CURRENT STATE OF DEVELOPMENT

The state of development of the technology is at the stage of a prototype validated under real conditions.

INTELLECTUAL PROPERTY RIGHTS

The technology is protected through Spanish patent application P202130501, with the title " Photocatalyst material and nanometric coating obtained from it" and priority date 02/06/2021.

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COLABORATION SOUGHT

- License agreement for use and exploitation.
- R&D project to advance development of new applications.

RELATED IMAGES

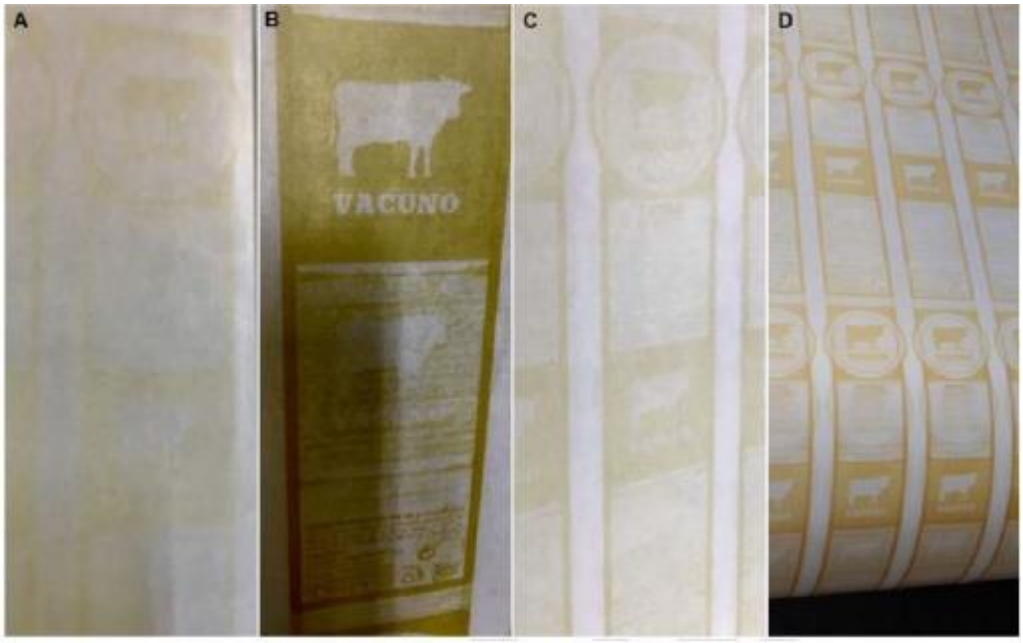

Figure 1: Resulting labels using different polymeric matrices.

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