New fluorescent/magnetic systems to prevent counterfeiting

Brief description

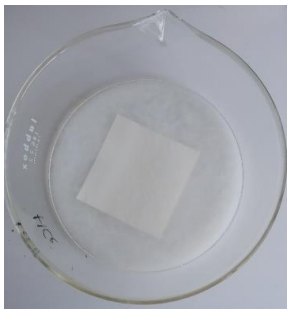


Figure 1. *Sheet of paper immersed in the cellulose solution*

In the UCM research group on TECHNOLOGIES BASED ON INORGANIC-ORGANIC HYBRID MATERIALS, work is being done on the preparation of fluorescent and/or magnetic nanoparticles that have a wide potential for application in the banknote industry to prevent counterfeiting.

Our research focuses on the preparation and study of new systems based on fluorescent and/or magnetic nanoparticles that are stable, biocompatible and non-toxic and that allow the obtaining of samples that, when properly inserted on the surface of the paper of current banknotes, make it difficult to counterfeit.

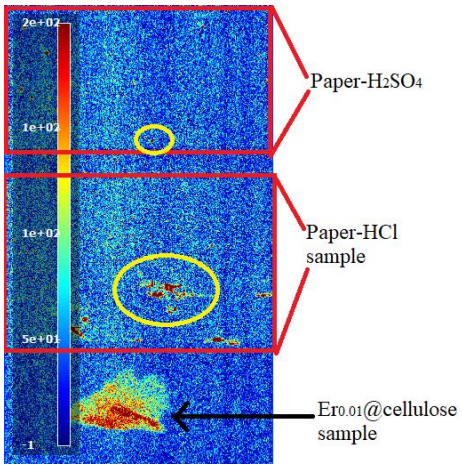
How does it work?

Once obtained and characterized, these systems will be able to operate in the paper industry in the following way. The insertion or adhesion of these systems in the paper of the banknote will allow its magnetic and fluorescent identification, working both in the infrared spectrum range and in the UV-Vis spectrum.

What problem does it solve?

Its use in the paper industry will prevent counterfeiting banknotes. This is a difficult issue to solve considering that the composition of what is used today is well known by those who counterfeit. For this reason, we focus our research on obtaining new systems that not only work within the UV-Vis spectrum and that allow better magnetic characterization.

Figure 2. *Image recorded during the excitation of the samples.*



What future products will it develop?

As a result of our research, new magnetic-fluorescent systems will be obtained for application in the paper industry.

Competitive advantages compared to another research

Over the years, fluorescent samples emitting in the UV-Vis range have been used. Our research opens the possibility of making identifications between 390 and 1600 nm, with the consequent progress that this represents.

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Where has it been developed?

The UCM research group on TECHNOLOGIES BASED ON INORGANIC-ORGANIC HYBRID MATERIALS led by J. Isasi Marín, full Professor in the Department of Inorganic Chemistry, and M. Alcolea Palafox, full Professor in the Department of Physical Chemistry of the Faculty of Chemical Sciences of the UCM https://www.ucm.es/materialesaplicados/. María del Carmen Martínez Rincón, María Lourdes de Pedraza Velasco, María Paloma Posada Moreno, María Rapp Diez de la Cortina, Esther Hernán García and Luis Espada Morán are also members of the group. The first three are full Professors in the Department of Nursing of the Faculty of Nursing, Physiotherapy and Podiatry. The PhD students María Rapp Diez de la Cortina and Esther Hernán García are carrying out their doctoral thesis under the supervision of J. Isasi. Finally, Luis Espada Morán is a Computer Services Technician. Atos-CAU Department of Sciences.

And moreover…

The UCM research group on TECHNOLOGIES BASED ON INORGANIC-ORGANIC HYBRID MATERIALS maintains a direct relationship with the UAM since they have shared and continue to share research projects with D. Jaque Daniel Jaque García, University Professor in the area of Applied Physics at the Autonomous University of Madrid in the Department of Materials Physics, Director of the NanoBIG Research Group (Nanomaterials for Bioimaging Group).

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