Scientists describe a hybrid laminate material with magnetic and photoactive properties

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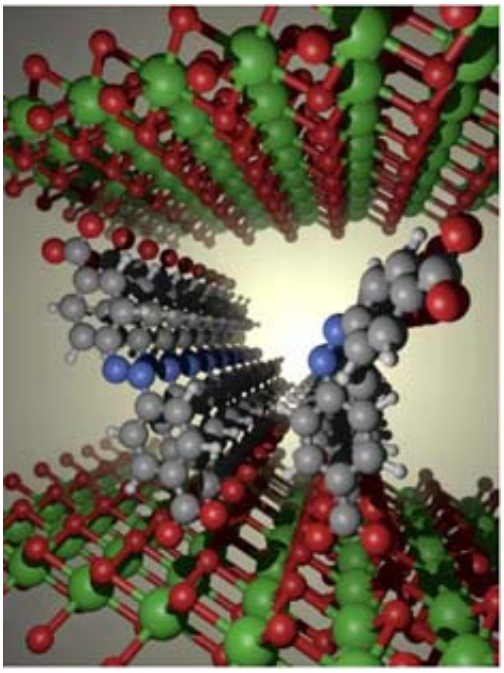

Valencian scientists describe a hybrid laminate material with magnetic and photoactive properties

Research conducted by the Institute for Molecular Science of the Universitat de València and of the Institute for Chemical Technology of the Universitat Politècnica de València and the Spanish National Research Council, confirms for the first time the possibility of modulating the magnetic properties of an inorganic material through

organic photoactive molecules activated by light.

The scientists have developed a study that has become one of the most successful approaches for obtaining new, chemically designed hybrid materials.

The study and research on multifunctional hybrid materials is one of the hot topics of numerous research groups worldwide. Our scientists have succeeded in synthesizing a hybrid laminar material in which magnetic properties based on hydroxides have been modulated, thanks to the size changes produced in azo molecules under the effect of a light stimulus.

When exciting the azo molecules with ultraviolet light, the inorganic matrix layers decrease its distance and, therefore, the magnetic properties. The hybrid laminar material can return to its original state when exposed to water or to certain air humidity,due to recovery of the initial distance between the inorganic matrix layers.

The success of this research is based on the interleaving of photoactivatable anionic molecules into the interlamellar space of the inorganic matrix and on achieving the trans-cis isomerization reaction in solid state within the nanometric space left between the layer.

Thanks to this research, the path for modulating the magnetic properties of a material is open, applying external stimulus such as light, heat and humidity, etc. Thus it is demonstrated that the combination of two components involves more than the simple linkage of functionalities, and which acquire, by a cooperative mechanism, new properties not previously achieved, which offers a wide range of possibilities in fields such as spintronics or sensors. These results were published last June in the issue 24 of the journal *Advanced Materials*.

This research constitutes an important advance toward chemical design

of a great range of functional hybrid materials through the deliberate choice of a matrix that acts as a guest of the physical properties of the molecules interjected as hosts.

More information: Gonzalo Abellán, Eugenio Coronado, Carlos Martí-Gastaldo, Antonio Ribera, Jose Luis Jordá and Hermenegildo García. "Photo-Switching in a Hybrid Material Made of Magnetic Layered Double Hydroxides Intercalated with Azobenzene Molecules." *Advanced Materials* Volume 26, Issue 24, pages 4156–4162, June 25, 2014 DOI: 10.1002/adma.201400713

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