# Solvent encapsulation is the trick—a solid material with spin-transition solution-like behaviour

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A research Group led by CSIC Prof Daniel Ruiz at the Catalan Institute of Nanoscience and Nanotechnology (ICN2) has published a universal encapsulation method to integrate compounds into solid materials keeping while their useful properties unaltered, titled 'Liquid-Filled Valence Tautomeric Microcapsules: A Solid Material with Solution-Like Behavior'. The paper appears in *Advanced Functional Materials*.

Spintronics is a discipline exploring methods to store and manage digital information by using the spin of electrons. Metal complexes showing spin transition (i.e. reversible interconversion between different isomers) are among the best candidates for the preparation of molecular memories and spintronic devices. A major bottleneck for the use of these compounds in such high-value applications is the lack of reliable methodologies for their integration into solid materials, which often leads to detrimental effects on the optimal switchable properties shown in solution (e.g. loss of the interconversion capabilities). The research Group led by CSIC Prof Daniel Ruiz at the ICN2 has published in *Advanced Functional Materials* a universal encapsulation method to integrate those compounds into solid materials while keeping their useful properties unaltered. The article is entitled *Liquid-Filled Valence Tautomeric Microcapsules: A Solid Material with Solution-Like Behavior*.

Although some successful examples of the incorporation of these complexes into micro/nanoparticles and liquid crystals have been

reported in recent years, the approaches employed are rather specific and difficult to extend to other active compounds and types of material. As such, a general and scalable strategy enabling direct transfer of spin-transition behaviour from solution to solid state has yet to be developed. In this contribution the ICN2, researchers have successfully met this challenge by means of a simple, versatile and universal approach, which consists in the confinement of the metal complexes into liquid-filled polymeric capsules.

The present study demonstrates that this methodology meets the most important conditions required to integrate spin transition into functional materials: (1) it leads to solid microstructured materials that perfectly reproduce the well-established properties of complexes in solution; (2) it allows fine tuning of the switchable behaviour by merely replacing the solvent used in the encapsulation process; (3) it enables incorporation of spin transition into any final solid matrix of choice by simple dispersion of the liquid-filled capsules. All these features, in combination with its simplicity and the lack of synthetic modification of the complex, makes this strategy very appealing for the future fabrication of solid functional materials based on spin transition materials.

**More information:** "Liquid-Filled Valence Tautomeric Microcapsules: A Solid Material with Solution-Like Behavior." *Advanced Functional Materials*. DOI: 10.1002/adfm.201501166

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