

# Switchable Materials: The Versatility of Spin Crossover Compounds

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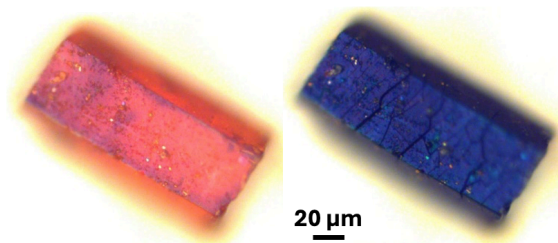
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Switchable compounds are an advanced class of materials that undergo reversible changes in their physical or chemical properties in response to external stimuli[1]. Their ability to "switch" between distinct states makes them invaluable for various technological applications, including electronics, photonics, and smart materials[2]

Among these, molecule-based spin crossover (SCO) complexes of specific transition metal ions stand out due to their ability to reversibly transition between low-spin (LS) and high-spin (HS) states. These transitions can be triggered by temperature, pressure, light, X-ray irradiation, or guest molecule inclusion, leading to significant variations in their magnetic, electronic, thermal, optical, and structural properties (see figure below)[3]

The great potential of such materials lies in the possibility of obtaining functionality in a single molecule, thus achieving a very high level of miniaturization of technology. In addition, these compounds are of technological interest due to their room temperature bistability. Another appealing aspect of the spin transition is that the switching of the electronic configuration can occur on a sub-ps time scale, which can be potentially translated into a very high bandwidth[4]

In this presentation, we will provide an overview of SCO materials and highlight our research efforts in designing highly selective SCO-based sensors, integrating them into spintronic devices, and leveraging their thermal regulation properties under ambient conditions for energy-efficient applications.



## References

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