

# LUMINESCENCE: AN EFFICIENT TOOL TO UNDERSTAND 4f-SINGLE-MOLECULE MAGNETS

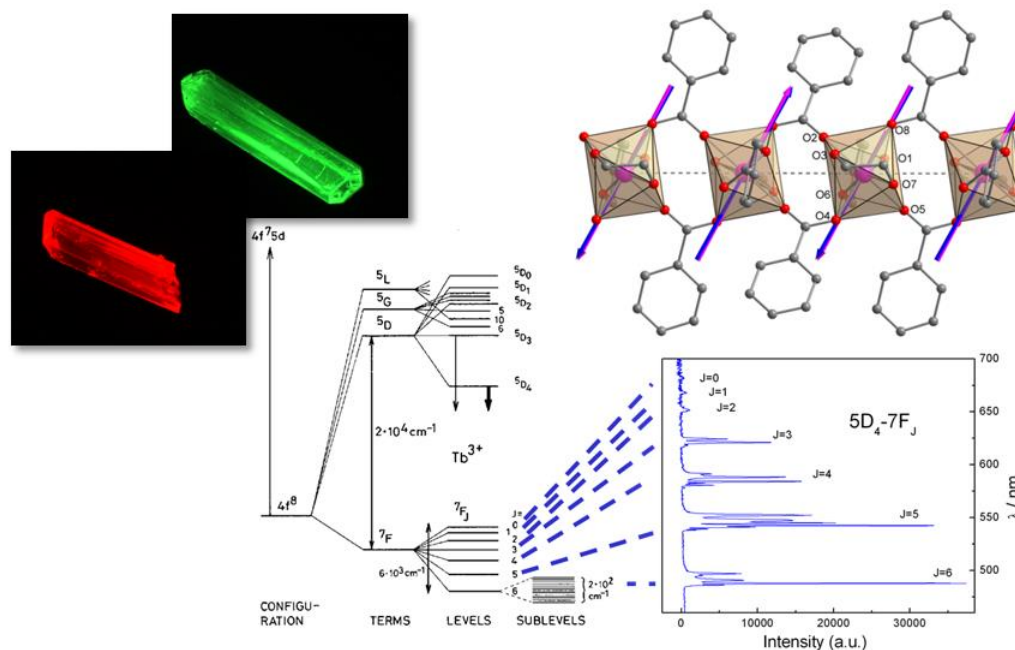
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Single-Molecule Magnets (SMM) are molecules that behave as magnets at the nanoscale level. In the last ten years a tremendous boost in the use of 4f ions to build SMMs has been observed. Indeed, astonishing examples of SMMs with hysteretic behavior in the liquid N<sub>2</sub> region has been reported.<sup>1</sup> The magnetic property of a given SMM rely mainly on the magnetic anisotropy of the metallic ions used. The characterization of this latter property is not always an easy and straightforward task.

However, luminescence is an intrinsic property of 4f ions that can be easily sensitized by organic ligands. Consequently, many 4f-SMMs present strong luminescence under UV irradiation either in the visible or infra-red region.<sup>2</sup> Some of us demonstrated that 4f-SMM emission spectrum is a direct observation of the energy scheme responsible for their magnetic behavior.<sup>3-5</sup> Luminescence is then a simple, useful, and easy-to-handle spectroscopy technique to characterize 4f-SMMs.

We will present the main challenges in magneto-luminescent correlations as well as a survey of the literature and hints toward good and bad practices in this very recent field.



**Figure 1.** Magneto-luminescent correlations in 4f-SMMs.

[1] Goodwin, C. A. P.; Ortu, F.; Reta, D.; Chilton, N. F.; Mills, D. P. *Nature* **2017**, *548*, 439. [2] Yi, X.; Bernot, K.; Pointillart, F.; Poneti, G.; Calvez, G.; Daiguebonne, C.; Guillou, O.; Sessoli, R. *Chem.-Eur. J.* **2012**, *18*, 11379. [3] Boulon, M. E.; Cucinotta, G.; Luzon, J.; Degl'Innocenti, C.; Perfetti, M.; Bernot, K.; Calvez, G.; Caneschi, A.; Sessoli, R. *Angew. Chem.-Int. Edit.* **2013**, *52*, 350. [4] Cucinotta, G.; Perfetti, M.; Luzon, J.; Etienne, M.; Car, P.-E.; Caneschi, A.; Calvez, G.; Bernot, K.; Sessoli, R. *Angew. Chem.-Int. Edit.* **2012**, *51*, 1606. [5] Yi, X.; Bernot, K.; LeCorre, V.; Calvez, G.; Pointillart, F.; Cador, O.; Le Guennic, B.; Jung, J.; Maury, O.; Placide, V.; Guyot, Y.; Roisnel, T.; Daiguebonne, C.; Guillou, O. *Chem. Eur. J.* **2014**, *20*, 1569.