**4*d* and 4*f* Paramagnetic Metal Ions for Elaborations of TTF-Based-Multifunctional Materials**

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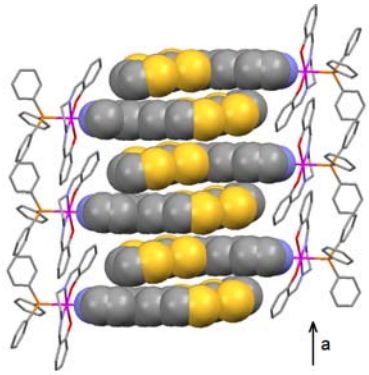
One of the most important challenges in the material science is the design of new molecules presenting a synergy between several physical properties, for example, electronic conductivity and magnetism. To do so, a strong coupling between localized *d* (coming from metal ions) and mobile π (coming from TTF derivatives) electrons must take place through a covalent bridge.

In one hand, the 4*d* metal ions may permit to increase this π-*d* interaction due to the most diffuse character of the 4*d* orbitales than for 3*d* ones.

In other hand, the 4*f* elements may permit the appearance of new physical properties like high spin molecules, Single Molecule Magnets and Luminescence.

In these ways, the mononuclear compounds [Ru(salen)($PPh_3$)(TTF-CH=CH-Py)]($BF_4$) [1] and ([Gd(hfac)$_3$(TTF-CONH-2-Pym-1-oxide)$_3$]($CH_2Cl_2$)·0.5($C_6H_{14}$) [2] will be presented and their physical properties discussed.




Crystal structure of [Ru(salen)($PPh_3$)(TTF-CH=CH-Py)]($BF_4$) highlighting the packing of the donors.

[1] F. Pointillart *et al.*, Inorg. Chem. 47 (2008) 9730.
[2] F. Pointillart *et al.*, Inorg. Chem. D.O.I. 10.1021/ic9003966.