Minicolloque MMPS26 ☒ **Oral** ☐ **Poster**

Resistance Switching in Large-Area Vertical Junctions of the Molecular Spin Crossover Complex [Fe(HB(tz)$_3$)$_2$]: ON/OFF Ratios and Device Stability

Yuteng Zhang[a,b*], Isabelle Séguy[b], Lionel Salmon[a], Karl Ridier[a], Gabor Molnar[a], et Azzedine Bousseksou[a]

a. LCC, UPR8241, CNRS & University of Toulouse, Toulouse, France
b. LAAS, UPR8001, CNRS & University of Toulouse, Toulouse, France

* email : yuteng.zhang@lcc-toulouse.fr

We have fabricated in a well-reproducible manner, large-area crossbar junctions with ITO/spin-crossover/metal multilayer structure, integrating high-quality [Fe(HB(1,2,4-triazol-1-yl)$_3$)$_2$] spin crossover films [1-4]. Taking advantage of the non-linear current-voltage characteristics, we show that there exists a voltage range, delimited by the turn-on voltages in the low spin and high spin states, which allows for maximizing the resistance switching. This approach, combined with a careful exposure of the devices to high temperature, voltage bias and air, allowed us to reach ON/OFF switching ratios of *ca*. 2-3 orders of magnitude. Despite different metals (Al/Ca) were employed as cathode material, the device characteristics remained similar indicating that electron injection is not the key factor in the resistance switching properties. This latter is most likely linked to the charge transport in the spin crossover film. Device stability upon voltage and temperature cycling was also investigated.

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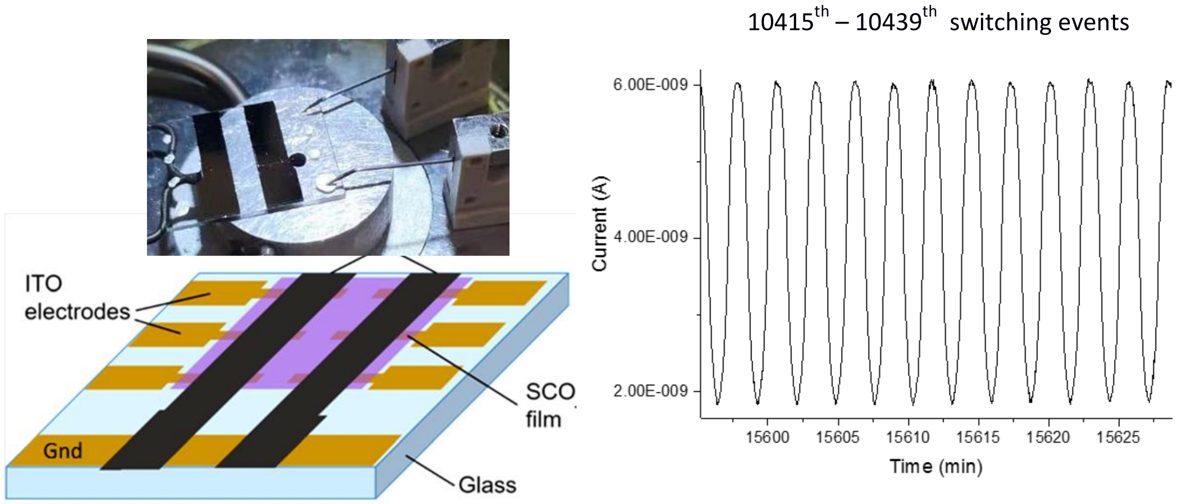
10415th – 10439th switching events

Figure 1: Resistance switching cycles between the high spin (low current intensity) and low spin (high current intensity) molecular spin states in a ITO/[Fe(HB(1,2,4-triazol-1-yl)$_3$)$_2$]/Al large-area vertical junction following >10.000 switches after stored at ambient environment for one year. The scheme and the photograph show the device under test.