

Hybrid Materials for Molecular Spintronics: Fabrication of spin-OLEDs

Universidad de Valencia. Instituto de Ciencia Molecular
Edificios Institutos de Paterna. Catedrático José Beltrán Martínez nº 2
46980 Paterna - Spain

H. Prima-García,
E. Coronado and J. P.
Prieto-Ruiz

Spin-based electronics is one of the emerging branches in today's nanotechnology and the most active area within nanomagnetism. So far spintronics has been based on conventional materials like inorganic metals and semiconductors. Still, an appealing possibility is that of using molecule-based materials, as components of new spintronic systems [1]. In particular, by taking advantage of a hybrid approach one can integrate molecular materials showing multifunctional properties into spintronic devices. In this talk we illustrate the use of this approach to fabricate multifunctional molecular devices combining light and spin-valve properties (i.e., Spin-OLEDs). So far only one report has been published which is based on the fabrication of an organic light emitting diode (OLED) with ferromagnetic electrodes [2]. Our approach is based on the use of a HyLED (Hybrid Light Emitting Diode) structure in which Fe or LSMO and Co are used as ferromagnetic electrode. This device works simultaneously as a spin valve and an electroluminescent device at low temperatures [3]. This new approach leads to a robust organic luminescent device in which light emission can be enhanced and modulated upon application of an external magnetic field.

201300083, 2013, Spanish Office of Patents and Trademarks. Ministry of Industry, Energy and Tourism.

References

- [1] J. Camarero, E. Coronado, J. Mater. Chem. 2009, 19, 1678.
- [2] T. Nguyen, E. Ehrenfreund, Z. Vally Vardeny, Science 2012, 337, 204.
- [3] Opto-spintronic device and its fabrication method. E. Coronado Miralles; H. Prima Garcia, J.P. Prieto Ruiz. Spanish National Patent. Ref.