

---

# When Organometallics Met Silica...New Luminescent Hybrid Materials

Jesús Berenguer<sup>\*1</sup>, Cintia Ezquerro<sup>1</sup>, Elena Serrano<sup>2</sup>, Elena Lalinde<sup>1</sup>, Elisa Fresta<sup>3</sup>,  
Javier García-Martínez<sup>2</sup>, and Rubén Costa<sup>3</sup>

<sup>1</sup>Organometallic Molecular Materials. Centro de Investigación en Síntesis Química (CISQ) –  
Universidad de La Rioja, Madre de Dios, 51, E-26006, Logroño, Spain

<sup>2</sup>Molecular Nanotechnology Lab. – Departamento de Química Inorgánica. Universidad de Alicante,  
Carretera San Vicente s/n, E-03690, Alicante, Spain

<sup>3</sup>Hybrid optoelectronic materials and devices. – IMDEA Materiales, E-28906, Getafe, Madrid, Spain

## Abstract

Incorporation of light-active metal complexes to solid inorganic matrices offers an attractive strategy to obtain new hybrid photonic materials. Between them, mesoporous luminescent silica based materials have raised big expectative in the last decade due to their potential optical, biological or photocatalytical applications.[1]

In the last years, our group has developed a new one-pot strategy for the design of this kind of materials based on the co-condensation of an adequate source of silica (e.g. TEOS) with metal complexes functionalized with terminal alcoxysilane groups.[2] This methodology has allowed us to obtain very stable mesoporous materials with enhanced luminescence and different macroscopic and textural properties (powdery solid with organized or open frameworks, optically transparent gels or different sized nanoparticles), just starting from the same precursors and only smoothly varying the reaction conditions or the presence or absence of surfactant. Part of this synthetic strategy and some recent applications of these materials in hybrid LED architectures will be presented in this communication.

## References

- Y. Feng, N. Panwar, D. Tng, S. Tjin, K. Wang and K.-T. Yong, *Coord. Chem. Rev.*, 2016, **319**, 86-109
- M. Rico, A. E. Sepúlveda, S. Ruiz, E. Serrano, J. R. Berenguer, E. Lalinde and J. García-Martínez, *Chem. Commun.*, 2012, **48**, 8883-8885. b) C. Ezquerro, A. E. Sepúlveda, A. Grau-Atienza, E. Serrano, E. Lalinde, J. R. Berenguer and J. García-Martínez, *J. Mater. Chem. C*, 2017, **5**, 97214-9752.

**Keywords:** Hybrid materials, organometallics, silica, mesoporous, nanostructured, nanoparticles, hybrid LEDs

---

\*Speaker