

VISITING SCIENTIST

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il Prof. Matteo Mauro

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terrà il seminario dal titolo:

**Phosphorescent complexes based on
N-heterocyclic carbene scaffolds: from tuning
of the excited-state dynamics to applications**

Phosphorescent complexes have been extensively investigated in the last few decades in the fields of organometallic chemistry as well as materials science due to their appealing applications as emitters in optoelectronics, solar-energy harvesting, sensing, photocatalysis and biomedicine.^[1] Despite several advances have been made in the field in the recent past, achieving efficient (electro)luminescence in the red to NIR is still highly challenging, due to *energy gap law* considerations.

During the talk, our most recent results in the field of metal complexes bearing N-heterocyclic carbene ligands will be presented along with their applications.^[2] It will be discussed how *multi-metallic* strategies over the more classical mono-metallic one might help improving excited state properties by chemical design.^[3] In particular, a novel class of cationic heterobimetallic Ir^{III}/M^I complexes, where M^I = Cu^I and Au^I, will be presented.^[4] These compounds show vibrant red phosphorescence with high photoluminescence quantum yield, up to 77%. These values are much higher than those of the corresponding mononuclear benchmarks and prompted application as electroluminescent materials in efficient red light-emitting electrochemical cells (LECs).^[5] On the other hand, a novel family of long-lived benzannulated NHC Re(I) complexes will be presented along with their use as efficient photopolymerization catalysts in 3D and 4D printing.^[6]

References

[1] H. Yersin (Ed.), *Highly Efficient OLEDs with Phosphorescent Materials*, Wiley-VCH, Weinheim, 2008; N. Armaroli and H. J. Bolink (Eds.), *Photoluminescent materials and electroluminescent devices*, *Top. Curr. Chem.*, **2017**, 374; [2] A. Bonfiglio, M. Mauro, *Eur. J. Inorg. Chem.*, **2020**, 3427; [3] M. Mauro, *Chem. Comm.*, **2021**, doi: 10.1039/D1CC01077H; [4] A. Bonfiglio, L. Pallova, V. César, C. Gourlaouen, S. Bellemin-Laponnaz, C. Daniel, F. Polo, M. Mauro, *Chem. Eur. J.* **2020**, 26,11751; [5] *manuscript in preparation*; [6] a) H. Chen, Y. Zhang, A. Bonfiglio, F. Morlet-Savary, M. Mauro, J. Lalevée, *ACS Appl. Polym. Mater.*, **2021**, doi: 10.1021/acsp.0c01207; b) A. Bonfiglio, K. Magra, C. Cebrián, F. Polo, P. Gros, P. Mercandelli, M. Mauro, *Dalton Trans.*, **2020**, 49, 3102.

La presenza della S. V. sarà molto gradita

Andrea Biffis
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Il Direttore del Dipartimento
Michele Maggini