

# (NHC) Cu(I) Complexes bearing Dipyriddyamine ligands : Synthesis, Structural, Photoluminescent Studies and Applications in Luminescent Materials.

Margaux ELIE,<sup>[a]</sup> Fabien SQUERRA,<sup>[b]</sup> Florent DI MEO,<sup>[c]</sup> Michael D. WEBER,<sup>[d]</sup> Ronan MARION,<sup>[a]</sup> Jean-Luc RENAUD,<sup>[a]</sup> Mathieu LINARES,<sup>[c,\*]</sup> Matthieu HAMEL,<sup>[b,\*]</sup> Rubèn D. COSTA,<sup>[d,\*]</sup> and Sylvain GAILLARD<sup>[a,\*]</sup>

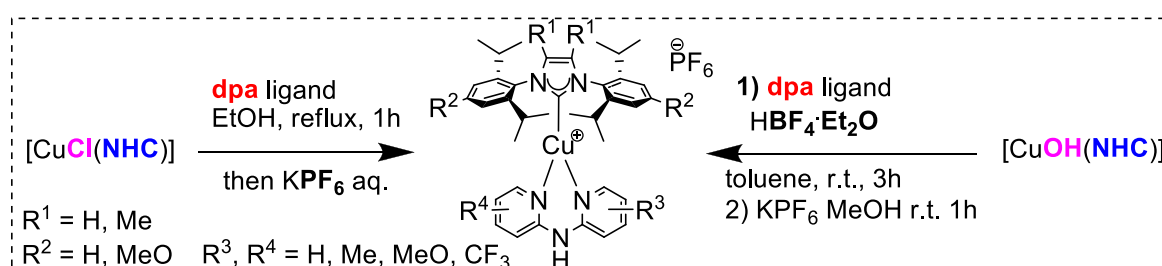
[a] LCMT, Normandie University, CNRS, UMR 6507, ENSICAEN, Caen, France

[b] CEA, LIST, Saclay, Laboratoire Capteurs et Architectures Electroniques, F-91191, Gif-sur-Yvette Cedex, France

[c] Department of Physics, Chemistry and Biology SE-581 83, Linköping University, Sweden

[d] Department of Chemistry and Pharmacy at the University of Erlangen-Nuremberg, 91058 Erlangen, Germany

We present in this communication the synthesis of new cationic tricoordinated copper complexes bearing bidentate dipyriddyamine (dpa) ligands and NHC as ancillary ligands  $[\text{Cu}(\text{NHC})(\text{Hdpa})][\text{X}]$ .<sup>(1,2)</sup> These copper complexes have been fully characterized by NMR, X-ray analysis, electrochemistry, and photophysics. TD-DFT calculations were also undergone to rationalize the assignment of the photophysical properties. Some of these copper complexes exhibit very bright blue emission with high quantum yield at solid state. A variation of the electronic properties on both NHC and dipyriddyamine ligands, has been carried out and permitted to establish a structure – properties relationship, also supported by TD-DFT calculations. A photophysical study at low temperature highlighted a specific luminescence phenomenon of the complexes: Thermally Activated Delayed Fluorescence. Since emissive cationic organometallic complexes can be good candidates for LEC (Light emitting Electrochemical Cells) applications, a selection of copper complexes was achieved for the preparation of those lighting devices. Here is presented the proof of concept that our copper complexes, of general formula  $[\text{Cu}(\text{NHC})(\text{dpa})][\text{X}]$ , can be applied for LEC devices. To the best of our knowledge, we are presenting here the first blue emitting LEC device incorporating cationic copper complexes.<sup>(2)</sup>



Main body with references.<sup>1,2</sup>

(1) Marion, R.; Sguerra, F.; Di Meo, F.; Sauvageot, E.; Lohier, J.-F.; Daniellou, R.; Renaud J.-L.; Linares, M.; Hamel, M. Gaillard, S. *Inorg. Chem.* **2014**, *53*, 9181-9191

(2) Elie, M.; Sguerra, F.; Di Meo, F.; Weber, M. D.; Marion, R.; Grimault, A.; Lohier, J.-F., Renaud, J.-L.; Costa, R. D.; Linares, M.; Hamel, M.; Gaillard, S. (Submitted)

