Design and synthesis of a multitopic pro radical probe for the detection of oxidative stress

J. K. Molloy,[a]* D. Mouchel Dit le Guerrier,[a] R. Barré,[a] D. Imbert,[b] O. Jarjayes, [a] C. Philouze, [a] P. H. Fries,[c] F. Thomas*[a]

[a] Département de Chimie Moléculaire, Université Grenoble Alpes, UMR 5250 CNRS, UGA, CS40700, 38058 Grenoble cedex 9, France.
[b] Univ. Grenoble Alpes, CEA, CNRS, IRIG-LCBM, 38000 Grenoble, France
[c] MEM, UMR-E3 CEA-UGA, INAC, CEA-Grenoble, 17 rue des martyrs, 38054, Grenoble cedex 9, France
jennifer.molloy@univ-grenoble-alpes.fr

ROS play an essential role in important physiological processes such as signaling and immune response.[1] The uncontrolled production of these species can however lead to oxidative stress, which is believed to be the origin of major pathologies, including cancer and neurodegenerative diseases.[2] The design of redox active probes for the monitoring oxidative stress or hypoxia in real time is particularly interesting from a medical point of view. Lanthanide complexes possess interesting luminescent and magnetic properties for use in medical imaging, however, the lack of controllable changeable oxidation states hinders their use as intrinsic detectors of redox processes. Our approach focuses on the design and synthesis of novel pro-radical ligands which, produce an easily detectable change in the complex properties.[3] We herein report the design and synthesis of pro radical lanthanide complexes containing a redox non-innocent ligand, capable of inducing a response from the coordinated lanthanide ion. These complexes and their response have been studied via electrochemistry, EPR, UV-vis and luminescent spectroscopy and CEST.

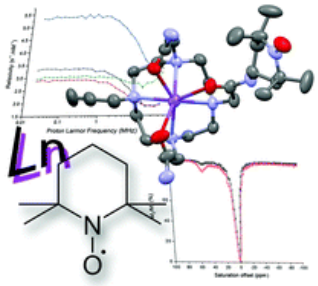

Figure: DOTA based Ln^{III} complex containing redox non-innocent ligand showing magnetic response.

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