Luminescent lanthanide complexes as molecular and solid probes.

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Previous works of our team were devoted to the design and the study of highly luminescent species sensitized by two-photon excitation, enabling high-resolution tridimensional imaging of cellular medium.1 It required the design of a series of π-conjugated antennas and a clear understanding of the whole sensitization pathway till an efficient excitation of lanthanide ions. Recently, this approach was rewarded by the discovery of a new complex which shows a high sensitivity to the neighbouring medium (in particular, its oxygen concentration). It enabled an intracellular mapping of the probe luminescence lifetime demonstrating a possible functional imaging.2

This first results initiated the development of a new class of compounds that could also be sensitive to other biological parameters, such as: temperature, pH, or viscosity. Beyond new luminescent bioprobes for imaging, we also expect that such compounds, among the brightest complexes ever reported,3 could offer applications as precursor for functional materials. Our first attempts on the preparation of colorimetric thermometers will be presented.



Figure a) mapping of intracellular luminescence lifetime obtained with a terbium complex and b) colour change of a mixture of Eu and Tb complexes at different temperatures.

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3 A. T. Bui, A. Roux, A. Grichine, A. Duperray, C. Andraud, O. Maury, *Chem. Eur. J.*, **2018**, 24, 3408.