Photo-Acidic *and* -Basic Transition Metal Compounds

Scientific Achievement

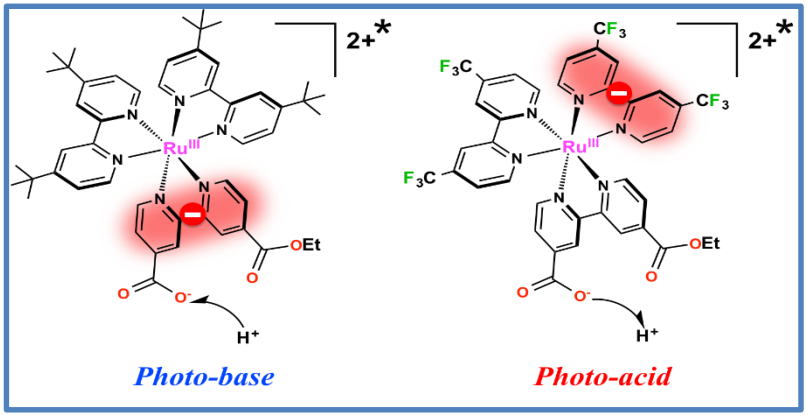
- **The first example where a single functional group could be made more basic *or* more acidic by light absorption was described.**
- **The first proton transfer kinetics for an inorganic excited state were reported.**

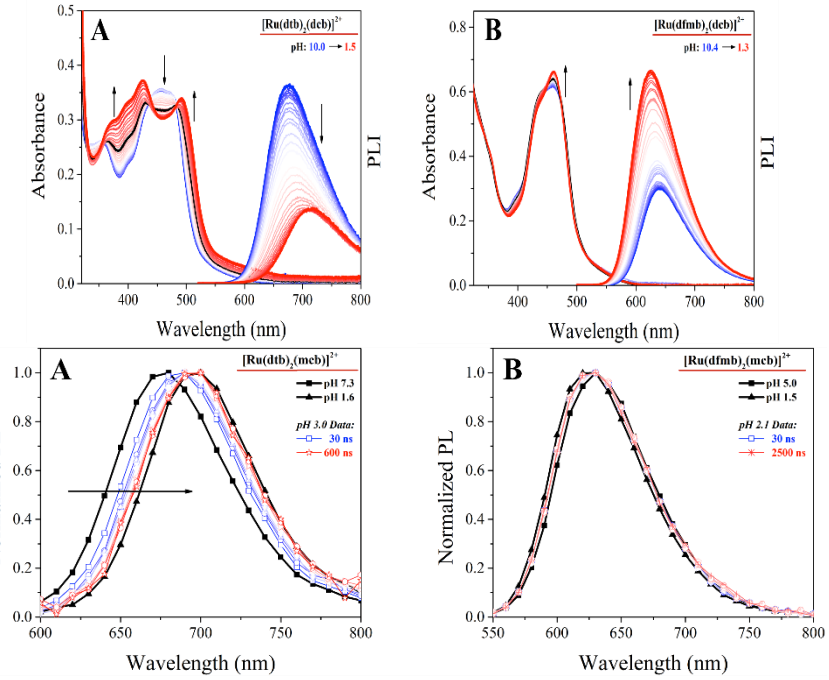
Significance and Impact

- **Control of excited states that can undergo proton and/or electron transfer reactions is important for applications in energy science.**
- **This class of excited states continues to be widely used at sensitized metal oxide interfaces.**

Research Details

- For all dcb compounds, the ground state pK_{a1} ~ 2.1 and pK_{a2} ~ 3.0.
- For the mcb compounds, pK_a = 2.3 and pK_a^* = 3.2 (dtb) or 2.0 (CF_3).
- The excited state proton transfer rate constant was 6.0 X 10^6 s^{-1} (dtb) and > 10^8 s^{-1} for (CF_3).





O'Donnell, R.M.; Sampaio, R.N.; Li, G.; Johansson, P.G.; Ward, C.L.; Meyer, G.J. *J. Am. Chem. Soc.* **2016**, *138*, 3891-3903. DOI: 10.1021/jacs.6b00454.

Work was performed at UNC-Chapel Hill.

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