Adventures in the photophysics of triazole-based complexes

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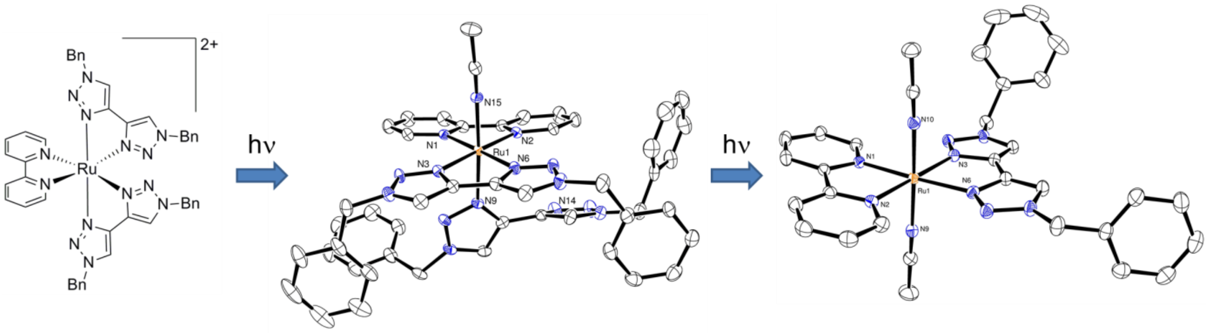
Copper-catalysed alkyne/azide coupling (CuAAC) chemistry for the formation of 1,2,3-triazoles has proved to be a versatile tool for ligand design in transition metal chemistry. 1,2,3-triazole-containing analogues of familiar oligopyridine ligands have revealed a rich coordination chemistry and resulted in complexes displaying intriguing photophysical properties. A wide range of triazole-based complexes have been reported which exhibit efficient phosphorescent emission, for example, whilst others have been shown to undergo remarkably facile photochemical conversion.

Triazole-containing complexes of rhenium(I)[1] and iridium(III)[2] have been shown to be brightly luminescent. When incorporated as the N-donor moiety in cyclometalated ligand in iridium(III) complexes, CuAAC routes to ligand precursors allow for facile tuning of emission colour. In contrast, triazole containing complexes of ruthenium(II) display highly quenched emission or are non-emissive through ^{3}MLCT state destabilisation which facilitates ^{3}MC state population.[3] Ruthenium(II) 4,4'-bi-1,2,3-triazolyl (btz) complexes undergo photochemical ejection of the btz ligand.[4,5] Further, for the complex $[Ru(bpy)(btz)_2]^{2+}$ this process occurs with the unprecedented and umabiguous observation of a ligand loss intermediate, *trans*-$[Ru(bpy)(\kappa^2\text{-btz})(\kappa^1\text{-btz})(NCMe)]^{2+}$, which has been subject to spectroscopic[5] and crystallographic[6] characterisation. Theoretical data is presented suggesting the involvement of a unique 'flattened' ^{3}MC state with a solvent accessible site which would account for the unusual concomitant rearrangement of the remaining bidentate ligands.



The seminar will present these and more recent results from our laboratory involving the and photophysics of triazole-containing complexes including luminescent osmium(II) complexes and their application in light-emitting electrochemical cell devices.[7] Further, results will be presented on the extraordinarily facile and unprecedented ligand ejection photochemistry of the complex $[Os(btz)_3]^{2+}$ which proceeds in acetonitrile with the observation of both *cis* and *trans* ligand loss intermediates.

References

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