Role of solvent-ligand exchange in the reaction of iron(II) polypyridyl complexes with H$_2$O$_2$

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Iron polypyridyl complexes have been shown to be potent catalysts for epoxidation and cis-dihydroxylation of alkenes as well as oxidation of alkyl C-H bonds to alcohols and ketones using H$_2$O$_2$.\textsuperscript{[1]} Iron complexes with Tetradeutate nitrogen ligands such as TPA and BPMEN have been used in the stereoselective epoxidation using H$_2$O$_2$.\textsuperscript{[2]} The N3Py ligands, such as Bn-N3Py (figure 1) have been used for epoxidation also and have shown a strong dependence on solvent in their reactivity.\textsuperscript{[3]} The complex [Fe$^{II}$](BnN3Py)(CH$_3$CN)$_2$][ClO$_4$]$_2$ (1) provided cis-diol products in acetonitrile and trans-diols in acetone for the same substrate. Complex 1 has two labile CH$_3$CN ligands, one of which is easily displaced by water. In this presentation, we will discuss ligand exchange and its effect on electrochemical and spectroscopic properties and its role in allowing these complexes to react with H$_2$O$_2$.

References

