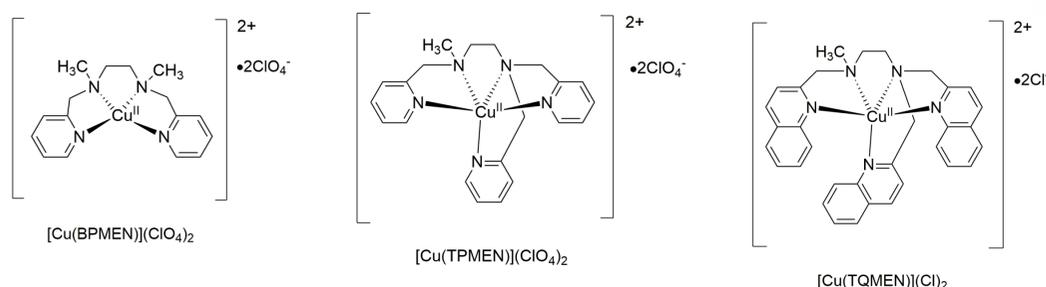


Characterization of N-polydentate Copper(II)-alkylperoxo Complexes

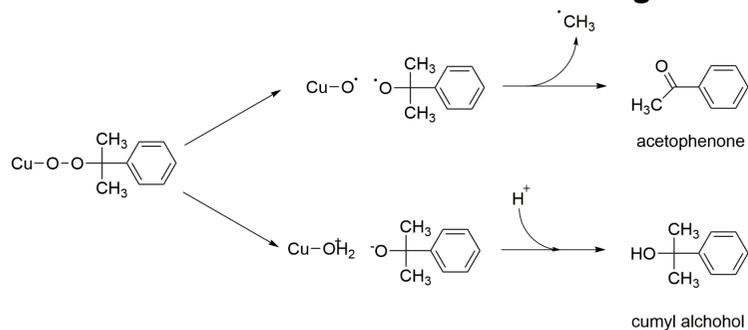
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Introduction

- Enzymes containing copper perform a multiplicity of functions in aerobic cellular life such as transporting oxygen, dismutating deleterious superoxide radicals into hydrogen peroxide and molecular oxygen, and activating molecular oxygen for substrate oxidations.
- Copper monooxygenases bind molecular oxygen and activate O—O bonds through electron additions and protonation to form reactive oxygen adducts. Disfunctional dopamine β -monooxygenase hydroxylation of dopamine to form norepinephrine has been linked to Parkinson's disease
- Our research focuses on the elucidation of O—O bond activation and cleavage by functional monocopper N-polydentate complexes with cumene hydroperoxide.



Activated O—O Bond Cleavage



Methods

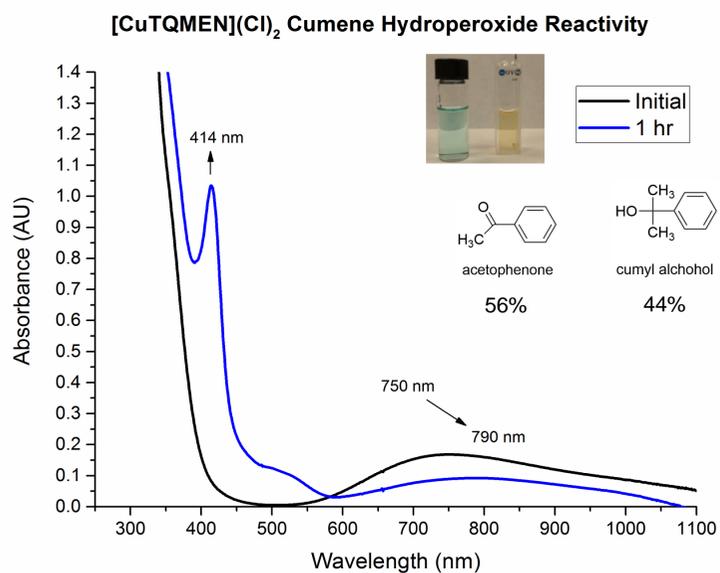
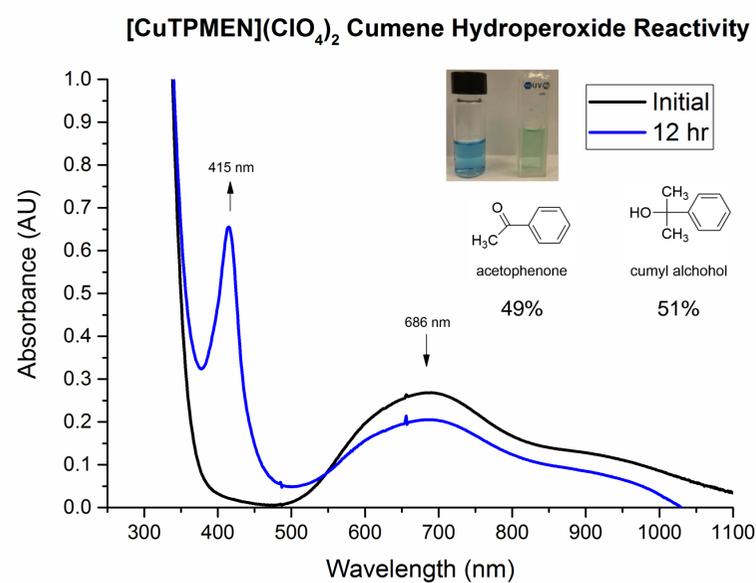
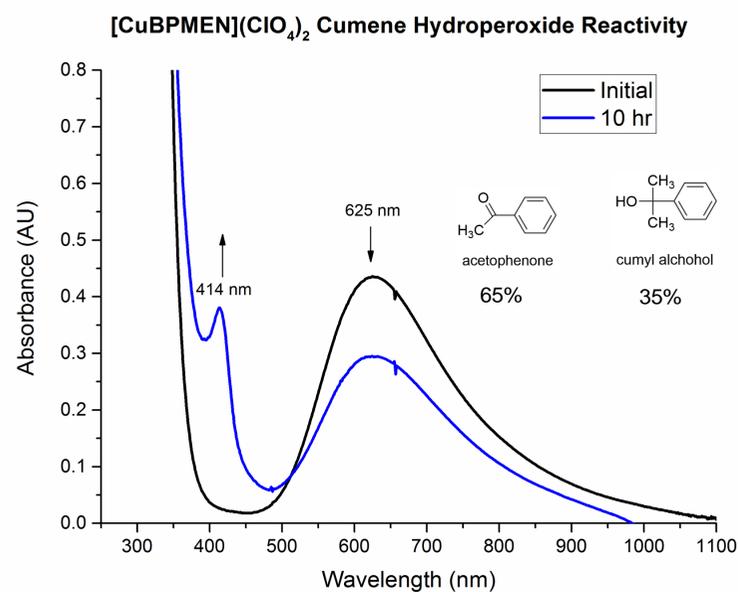
- Three biomimetic copper complexes were synthesized through the reaction of copper(II) salts with a N₄-tetradentate ligand, BPMEN [N,N'-Dimethyl-N,N'-bis-(pyridine-2-ylmethyl)-1,2-diaminoethane], and two N₅-pentadentate ligands, TPMEN [N,N,N'-Tris(2-pyridylmethyl)-N'-methylethylenediamine] and TQMEN [N,N,N'-Tris(2-quinolinemethyl)-N'-methylethylenediamine].
- [Cu(BPMEN)](ClO₄)₂, [Cu(TPMEN)](ClO₄)₂, and [Cu(TQMEN)](Cl)₂ reactivity with the artificial oxidant cumene hydroperoxide were characterized with a combination of UV-Vis spectroscopy and FID coupled gas chromatography.

Conclusions

- [Cu(BPMEN)](ClO₄)₂ displays a broad peak at 625 nm resembling other Cu(II) N₄-tetradentate complexes.² [Cu(TPMEN)](ClO₄)₂, and [Cu(TQMEN)](Cl)₂ display broad peaks at 686 nm and 750 nm respectively in agreement with previously reported Cu(II) N₅-pentadentate complexes.¹
- Peaks at 414-415 nm agree with previously reported N-polydentate Cu(II)-peroxo, Cu(II)-superoxo, and Cu(II)-alkylperoxo complexes.^{1,3}
- Cumene hydroperoxide decomposition products elucidate activated O—O bond cleavage.

Acknowledgements

Results



References:

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