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Deciphering the complex paramagnetic NMR spectra of small laccase

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Propositions

1. Peptide or small protein mimics are the ideal compounds to make an oxygen reduction catalysts for application in biofuel cells. (Chapter 1, this Thesis)
2. The tri-nuclear copper center in its native intermediate state has at least three chemical exchange processes due to the histidine ring motions. (Chapter 2, this Thesis)
3. A complete characterization of the tri-nuclear copper center by NMR spectroscopy can be achieved by second shell mutagenesis. (Chapters 3 and 4, this Thesis)
4. Gln291 is one of the important second shell residues to regulate oxygen reduction reaction by small laccase. (Chapters 4 and 7, this Thesis)
5. Modelling the tri-nuclear copper center can lead to the NMR signal assignment and identification of important motions.
6. Dipolar coupling strength is a robust tool to probe anisotropic motions in a strongly paramagnetic environment. (Chapter 6, this Thesis)
7. Low molecular weight oxygen catalysts can never be as efficient in oxygen reduction as laccases.
8. Laccases are the most versatile and powerful biocatalyst for bio-remediation of hazardous chemicals from the environment. Bilal *et al.* (2019) *Journal of Environmental Management*, 234: 253-264
9. Expectations are like fine pottery. The tighter you hold them, the easier it is to break.
10. “Difficult” and “impossible” are often mistaken for one another, despite them having very little in common
11. Sometimes it is wise to start from scratch because then you start from your experience