COPPER AND COBALT COMPLEXES FOR THE ELECTROCHEMICAL PROTON REDUCTION

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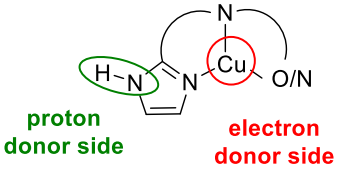
Electron transfer (ET) reactions are ubiquitous in nature. Numerous examples are well known to involve proton-coupled electron transfer processes (PCET), in particular, in redox reactions, which are relevant for energy conversion reactions or oxygenation reactions.[1] Iron and copper ions in the active centre of enzymes often play a crucial role in such reactions and thus, it is natural to investigate copper complexes in order to study PCET reactions.[2]

We synthesised copper(II) complexes having a N_2,O- or N_4-coordination sphere and ionisable NH-imidazole and NH-pyrazol protons[3] and investigated the thermodynamic coupling of the metal centred redox event and the protonation/deprotonation of the heterocycles. The complexes are structurally very similar and the change of one N-donor unit from imidazole to pyrazole does not lead to substantial changes. We determined the BDFE for the hypothetical reaction $(hcH)Cu^{I}$ $Cu^{II}(hc) + H^{\cdot}$ (hc = imidazole or pyrazole).

Finally, copper and cobalt complexes[4] were utilised in the electrochemically catalysed hydrogen evolution reaction and the results of the investigation will be presented.



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