Reversible O_2 binding monolayers on single-crystal Au(111)

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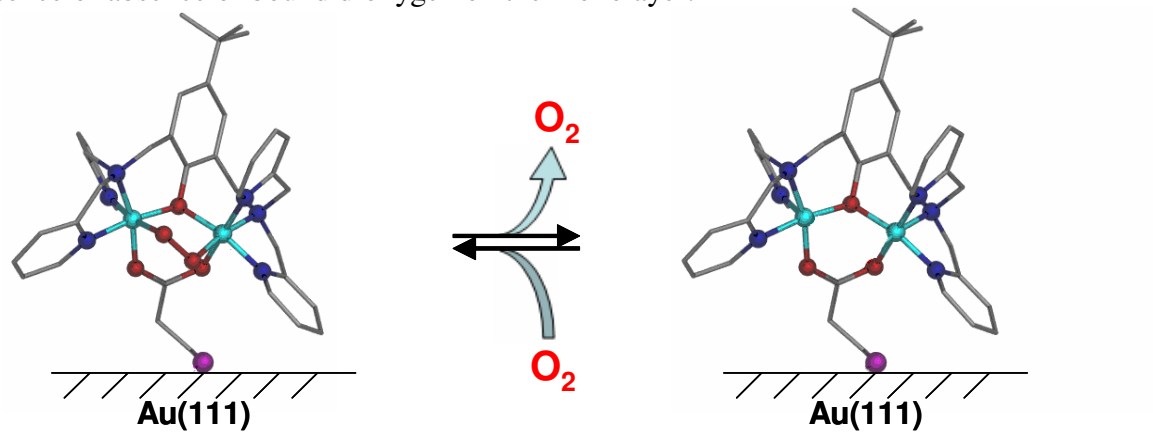
Dicobalt(II) complexes of heptadentate phenoxide-hinged dinucleating ligands can reversibly bind oxygen.[1] We have discovered a marked tuning of the redox properties and consequent dioxygen affinities of these systems by varying the electronegativity of auxillary carboxylate bridging ligands. Futhermore the solids are thermochromic and the transition temperatures can also be tuned by the auxillary carboxylate ligand.

Using a atomic planar single-crystal Au(111) surface as template, we have succeeded in generating a single molecule film (monolayer) capable of temperature controlled reversible dioxygen binding. This was achieved by functionalizing a dicobalt complex with thiol groups and attaching it to Au(111), Figure 1. Electrochemical measurements are used to signal the presence or absence of bound dioxygen on the monolayer.



1. M. Ghiladi, J. T. Gomez, A. Hazell, P. Kofod, J. Lumtscher and C. J. McKenzie, *J. C. S. Dalton Trans.* **2003**, *1320-1325.*