

ZERNIKE INSTITUTE COLLOQUIUM

Thursday, March 5th, 2009

16:00h, Lecture Hall: 5111.0080

Coffee and cakes from 15:30h

Diiron Complexes: from Biomimetism to Molecular Sensors

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Iron centers are ubiquitous in biology where they contribute to many essential functions (electron transport, dioxygen metabolism, ...). Understanding their mechanism of action at the molecular level has attracted much interest over the past decades, which has been even strengthened recently by the discovery of new enzymes following genomic and proteomic analyses. Magnetic spectroscopies have contributed heavily to many progresses by allowing the characterization of numerous interesting protein states, structural information being derived from comparison with synthetic chemical analogs. This has led to the development of biomimetic or bioinspired chemistry that aims at mimicking proteins functions and beyond at finding new properties.

The essential aspects of protein diiron sites will be described. In a first stage, the characterization of the newly discovered enzyme MiaE, that is involved in tRNA modification, will be presented as a text book example.

Then it will be shown how models of the dioxygen carrier hemerythrin can be obtained. In particular the exact location of the iron valences of the mixed valent forms will be reproduced. These models can be further modified to mimic oxygenases which perform oxygen atom transfers on various substrates including amines.

The last chemical models developed possess interesting redox properties dependent on the protonation state of the ligand that can be utilized to design molecular amine sensors.



Optical changes upon deprotonation
in solution (acetonitrile) and solid
state (adsorption on silica)

