ABSTRACT

Complexes of vanadium and molybdenum have been synthesized which will mimic various enzymes of biological relevance. Molybdenum(VI) catalyzed bromination of chosen organic substrates in presence of H_2O_2 shows that it could be a reaction mimic of the enzyme vanadium bromoperoxidase. Oxo diperoxo complex of vanadium(V), containing N-donor ligand histidine has been synthesized which could be a functional mimic at acidic pH. This complex could be a model for the binding site of the enzyme. Oxo diperoxo complexes of vanadium(V) and molybdenum(VI), containing ligand 3,5-dimethyl pyrazole have been synthesized which can catalyze oxo-transfer reactions and oxidize organic substrates. The complexes are characterized by I.R., UV-vis, ^{1}H, ^{13}C, ^{51}V n.m.r. spectra vanadium-phenolate chemistry as well as vanadium carboxylate interaction are of biological importance because of reported binding of vanadium to the metal tyrosinate protein transferrin and its interaction with the recently characterized polyphenol, tunichrome, in the vanadocytes of the tunicates. A new unsymmetrical pentadentate ligand (L) containing two phenolates and a carboxylate residue has been synthesized. This ligand shows high denticity in stabilizing relatively rare VO^{3+} motif in its complex [VOL]. The ligand and the complex have been characterized by I.R., UV-vis, ^{1}H, ^{13}C and ^{51}V n.m.r. spectra. Electrochemical behaviour of the complex shows a quasireversible couple due to V^{V}/V^{IV} reduction.

Key-words : vanadium bromo peroxidase, N-donor, histidine, functional mimic, 3,5-dimethyl pyrazole, oxo-transfer, transferrin, tunichrome, pentadentate, unsymmetrical, phenolate, carboxylate, denticity, quasireversible.