Phosphate binding divanadium complexes

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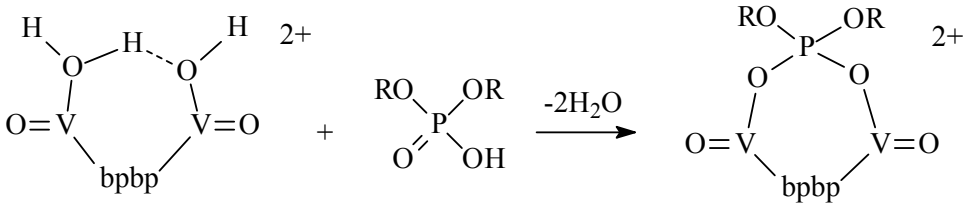
Vanadium complexes of the dinucleating ligand bpbp$^-$ (2,6-bis{[N,N-bis(2-pyridylmethyl)amino]methyl}-4-tertbutylphenolate) show a propensity for phosphate binding. Precursor molecules in which labile water/hydroxides ligands occupy the divanadium sites in IV-IV, IV-IV and V-V complexes have been isolated. These complexes can be reacted with a variety of alkylated and non-alkylated phosphates (scheme below) which end up bridging between the metal ions. The μ_2- and the more unusual μ_4-binding modes are found for the PO_4^{3-} unit in $[(VO)_2(bpbp)(PO_4H)]^+$ and $[(VO)_4(bpbp)_2(PO_4)]^{3+}$ respectively. The outcome of reaction of the $[(VO)_2(bpbp)]^{3+}$ with inorganic phosphate to produce one or the other species can be controlled. The complexes serve as models for the binding of biological phosphates by the $[(VO)_2(bpbp)]^{3+}$ unit and we are currently investigating the potential of these divanadium complexes in, e.g., recognizing and binding biological phosphates like DNA.



X-ray structure of the μ_4- PO_4^{3-} bridged tetranuclear V^{IV} complex.