

Novel Water-soluble Peroxo Complexes of Nb(V) and Ta(V)

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In recent years, multimetallic Nb-based oxides have generated considerable interest in many fields: these oxides are mainly described as ferroelectrics, ion conductors and oxidation catalysts. In the frame of research aimed at developing new synthetic procedures of these Nb-containing oxides, water-soluble peroxo complexes of niobium(V) and tantalum(V) have been prepared and investigated spectroscopically and structurally.

The compounds studied are of two types: peroxo-carboxylato and peroxo-polyaminocarboxylato (PAC) complexes, the latter ones will be described. The peroxo-PAC complexes were synthesized in the presence of excess hydrogen peroxide. These conditions led to the oxidation *in situ* of the nitrogen atoms of the ligands into N-oxides. Two PAC ligands were selected: ethylenediaminetetraacetic acid (H₄edta) and propylenediaminetetraacetic acid (H₄pdta).

The crystal structures of the guanidinium derivatives of the (edta)- and (pdta) Nb and also of the (edta)-Ta complexes have been determined at 100K. In all the three compounds, the metal exhibits an eightfold coordination by two bidentate peroxo ligands and a tetradentate bis(N-oxido) PAC ligand resulting in a distorted dodecahedral geometry. The coordination Nb-O and Ta-O bond lengths are very similar.

Keywords: niobium complexes, peroxo compounds, polyaminocarboxylate acids