

THE SOLUTION CHEMICAL BEHAVIOUR OF OXORHENIUM(V) AND HALF-SANDWICH RUTHENIUM(II) COMPLEXES CONTAINING A TRIPHENYLPHOSPHINE LIGAND

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Abstract

In the chemotherapeutic therapy of cancer there is an urgent need for the novel compounds, which have higher selectivity toward cancer cells and their use is accompanied with milder side-effects. In the field of inorganic medicinal chemistry a plethora of metal complexes with promising *in vitro* cytotoxic behavior was developed containing various metal ions (*e.g.* Cu(II), Au(III), Ru(II/III)) [1]. Complexes of Re(I) and Re(V) showed anticancer properties, and the latter group is able to cleave DNA [2]. Moreover, oxorhenium(V) complexes are catalyzing oxygen atom transfer reactions [3], which may occur intracellularly as well. The organometallic half-sandwich Ru(II) complexes containing cyclopentadiene (Cp) and triphenylphosphine (PPh₃) ligands were reported to exhibit anticancer activity *in vitro* and *in vivo* [4].

In this work I will introduce the different behavior of the PPh₃ containing Re(V) and Ru(II) complexes in solution (structures are shown in Figure 1.a,b). Synthesis and characterization of the complexes were followed and checked by ³¹P and ¹H NMR spectroscopy. For a RuCp complex, a single-crystal was also obtained which was suitable for X-ray diffraction analysis (Figure 1.c).

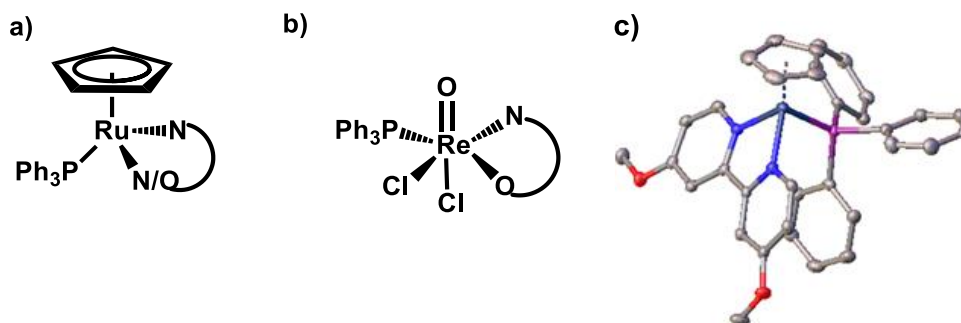


Figure 1. General structure of the studied a) RuCp and b) Re(V) complexes. c) ORTEP view of [RuCp(4,4'-dimethoxy-2,2'-bipyridine)(PPh₃)](CF₃SO₃) complex.

Since phosphines are generally oxygen-sensitive, oxidation of the coordinated PPh₃ ligand was followed by ³¹P NMR spectroscopy. The compounds were dissolved in different organic solvent-water mixtures and their stability in solution was monitored by UV-visible spectrophotometry and ¹H and ³¹P NMR spectroscopy as well. The two complex families displayed remarkable differences in their solution chemical properties.

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