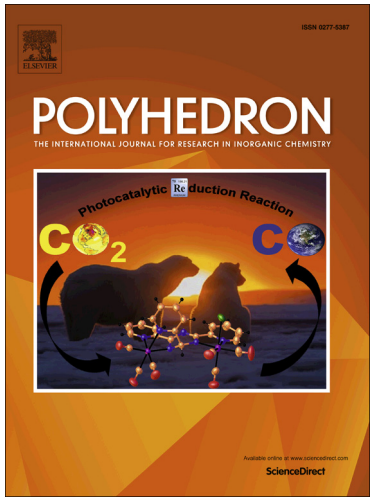

Synthesis, characterization, X-ray crystallography and stability in aqueous medium of *trans*-$[Ru(CO)(NH_3)_4P(OH)_3]^{2+}$

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PII: S0277-5387(16)30670-2
DOI: http://dx.doi.org/10.1016/j.poly.2016.12.019
Reference: POLY 12377

To appear in: *Polyhedron*

Received Date: 3 October 2016
Revised Date: 8 December 2016
Accepted Date: 16 December 2016

Please cite this article as: D.R. Truzzi, E.E. Castellano, D.W. Franco, Synthesis, characterization, X-ray crystallography and stability in aqueous medium of *trans*-$[Ru(CO)(NH_3)_4P(OH)_3]^{2+}$, *Polyhedron* (2016), doi: http://dx.doi.org/10.1016/j.poly.2016.12.019

Synthesis, characterization, X-ray crystallography and stability in aqueous medium of *trans*-$[Ru(CO)(NH_3)_4P(OH)_3]^{2+}$

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Keywords: Ruthenium complex / Carbonyl / Carbon monoxide / Phosphorous acid

Abstract

Here, we report the synthesis, characterization, crystal data and DFT calculation of a new water-soluble ruthenium(II) carbonyl complex. The *trans*-$[Ru(CO)(NH_3)_4P(O)(OH)_2]Cl$ is a robust complex in aqueous media. The pK_a of 3.3 for the phosphorous acid ligand in this complex was measured by infrared spectroscopy. The *trans*-$[Ru(CO)(NH_3)_4P(O)(OH)_2]^+$ exhibits just two slow reactions at pH 7.5: CO-Ru-$P(O)(OH)_2$ to CO-Ru-$(O)P(OH)_2$ isomerization ($k = 1.1 \times 10^{-5}$ s^{-1} at 25°C) and subsequent $P(O)(OH)_2$ dissociation ($k = 1.7 \times 10^{-7}$ s^{-1} at 25°C). The formation of O-bonded *trans*-$[Ru(CO)(NH_3)_4(O)P(OH)_2]^+$ was supported by IR, UV-vis and ^{31}P NMR spectroscopies and DFT calculations.