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Synthesis, structure and catalytic alcohol oxidation by ruthenium(III) supported by Schiff base and triphenylphosphine ligands

Li-Hua Tang, Fule Wu, Hui Lin, Ai-Quan Jia, and Qian-Feng Zhang*

*Institute of Molecular Engineering and Applied Chemistry, Anhui University of Technology,
Ma'anshan, Anhui 243002, P. R. China*

Treatment of $[\text{RuCl}_2(\text{PPh}_3)_3]$ with two equiv. bi-dentate Schiff base $N,O\text{-LH-Cl}$ ($N,O\text{-LH-Cl} = 2[(3\text{-chloro-phenylimino)-methyl-phenol}]$ or $N,O\text{-LH-NO}_2$ ($N,O\text{-LH-NO}_2 = 2[(4\text{-nitro-phenylimino)-methyl-phenol}]$) in the presence of triethylamine afforded *cis*- $[\text{RuCl}(\text{PPh}_3)(\kappa^2\text{-}N,O\text{-L-Cl})_2]$ (**1**) and *trans*- $[\text{RuCl}(\text{PPh}_3)(\kappa^2\text{-}N,O\text{-L-NO}_2)_2]\cdot\text{Et}_2\text{O}$ (**2**), respectively. Reactions of $[\text{RuCl}_2(\text{PPh}_3)_3]$ and equal equiv. tetra-dentate Schiff bases gave corresponding ruthenium(III) complexes $[\text{RuCl}(\text{PPh}_3)(\text{salen})]$ (**3**) ($\text{H}_2\text{salen} = N,N'\text{-disalicylidene-1,2-ethanediamine}$), $[\text{RuCl}(\text{PPh}_3)(\text{salipn})]\cdot 2\text{CH}_2\text{Cl}_2$ (**4**) ($\text{H}_2\text{salipn} = N,N'\text{-disalicylidene-1,2-(1-methyl)ethanediamine}$), $[\text{RuCl}(\text{PPh}_3)(\text{salpn})]\cdot\text{CH}_2\text{Cl}_2$ (**5**) ($\text{H}_2\text{salpn} = N,N'\text{-disalicylidene-1,2-propanediamine}$), $[\text{RuCl}(\text{PPh}_3)(\text{salphen})]\cdot\text{CH}_2\text{Cl}_2$ (**6**) ($\text{H}_2\text{salphen} = N,N'\text{-disalicylidene-1,2-phenyldiamine}$), $[\text{RuCl}(\text{PPh}_3)(\text{saltoln})]\cdot\text{CH}_2\text{Cl}_2$ (**7**) ($\text{H}_2\text{saltoln} = N,N'\text{-disalicylidene-1,2-tolyldiamine}$) and $[\text{RuCl}(\text{PPh}_3)(\text{salcyn})]$ (**8**) ($\text{H}_2\text{salcyn} = N,N'\text{-disalicylidene-(}R,R\text{)-1,2-cyclohexanediamine}$). The molecular structures of complexes **1–5** and **7** have been determined by single-crystal X-ray crystallography. The catalytic oxidation properties of ruthenium(III) complexes **1–8** were tested towards alcohols in the presence of *N*-methylmorpholine-*N*-oxide.

Keywords: Ruthenium(III) complex; Schiff base; Synthesis; Crystal structure; Catalytic oxidation

* Corresponding author. E-mail: zhangqf@ahut.edu.cn (Q.-F. Zhang).

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