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Syntheses, structures and catalytic properties of ruthenium(II) nitrosyl complexes with bidentate and tetradentate Schiff base ligands

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Treatment of $\text{Ru}(\text{NO})\text{Cl}_3 \cdot x\text{H}_2\text{O}$ with 1 equiv. bidentate Schiff bases in the presence of triethylamine in DMF/THF afforded a series of anionic ruthenium(II) nitrosyl complexes of the type $[\text{Et}_3\text{NH}][\text{Ru}(\kappa^2\text{-}N, O\text{-}L^R)(\text{NO})\text{Cl}_3]$ ($\text{HL}^R =$ 2-butyliminomethyl-phenol **1**, 2-(benzylimino-methyl)-phenol **2**, 2-[(4-chloro-phenylimino)-methyl]-phenol **3**, 2-[(4-nitro-phenylimino)-methyl]-phenol **4**, 2-[(2,6-diisopropyl-phenylimino)-methyl]-phenol **5**). Interaction of $\text{Ru}(\text{NO})\text{Cl}_3 \cdot x\text{H}_2\text{O}$ and 1 equiv. tetradentate Schiff bases under the same condition led to isolation of an anionic complex $[\text{Et}_3\text{NH}][\text{Ru}(\kappa^2\text{-}N, O\text{-}L\text{-CH}_2\text{CH}_2\text{-NOH})(\text{NO})\text{Cl}_3]$ ($\text{HL-CH}_2\text{CH}_2\text{-NOH} =$ N, N' -disalicylidene-1,2-ethanediamine **6**) and a neutral complex $[\text{Ru}(\text{salen-phn})(\text{NO})\text{Cl}]$ ($\text{H}_2\text{salen-phn} =$ N, N' -disalicylidene-1,2-phenyldiamine **7**). The molecular structures of $\mathbf{1} \cdot \frac{1}{2}\text{C}_2\text{H}_5\text{OH}$, **2–6**, and $\mathbf{7} \cdot \text{CH}_2\text{Cl}_2$ have been determined by single-crystal X-ray crystallography. Investigation of the catalytic properties of ruthenium(II) nitrosyl complexes **1–7** showed that they are efficient catalytic precursors for the transfer hydrogenation of acetophenone.

Keywords: Ruthenium complex; Schiff base; Nitrosyl ligand; Synthesis; Crystal structure

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