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New Ruthenium-Dimethyl-Sulphoxide Complexes with Picolylamine Ligands for Application in Catalysis of Olefin Metathesis

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Ruthenium complexes can be applied in various fields of research, especially in catalysis. This element is known for forming coordination compounds simply through easily prepared precursors, among which is Ruthenium-Dimethylsulfoxide (Ru-DMSO). This is a precursor complex with the formula *cis*,*fac*[$RuCl_2$(S-DMSO)$_3$(O-DMSO)] that features a ligand arrangement with steric and especially electronic synergy.[1] In this precursor, donor ligands such as Cl and O-DMSO are trans-positioned to acceptor ligands like S-DMSO. It is also known to perform well in reactions under mild temperature conditions; however, with heating and in the presence of light, it can form the more reactive isomer *trans*[$RuCl_2$(S-DMSO)$_4$] due to the greater trans effect. The Ru-DMSO precursor has a labile point in the molecule, the O-DMSO ligand, which can be easily substituted by other donor ligands. Among the chosen ligands, amino-alkyl-pyridines (picolylamines) can be used with the precursor in ligand exchange reactions. The 2-amino-methyl-pyridine (2-met-pic) and 2-amino-ethyl-pyridine (2-et-pic) are ambidentate ligands and were used, forming the new complexes *cis*,*fac*[$RuCl_2$(S-DMSO)$_3$(2-met-pic)] (Ru-2-met-pic) and *cis*,*fac*[$RuCl_2$(S-DMSO)$_3$(2-et-pic)] (Ru-2-et-pic), coordinating through the amino NH_2 groups. However, given the extent of the amino-alkyl substituent group, these ligands can also chelate the metal, this time coordinating through the pyridinic-N, forming 5- and 6-membered rings, substituting a *cis*-positioned S-DMSO to the picolylamine ligand, in an intramolecular reaction with increased temperature, forming the derived complexes *trans*,*cis*[$RuCl_2$(S-DMSO)$_2$(2-met-pic)] (Ru-2-met-pic') and *cis*,*cis*[$RuCl_2$(S-DMSO)$_2$(2-et-pic)] (Ru-2-et-pic'). Because of the Single-Crystal X-ray Diffraction (SCDRX) techniques, we can confirm the formed structures, which can be applied in homogeneous olefin catalysis reactions.[2]

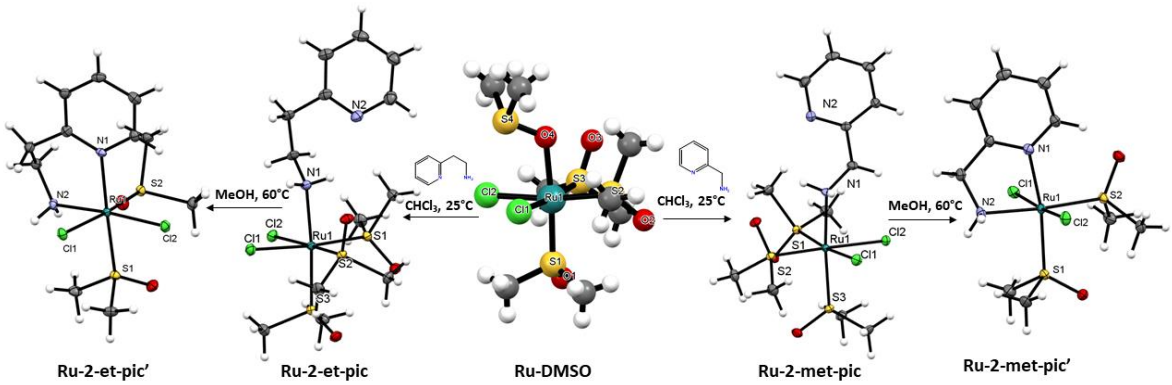

Figure 1. Solved structures by SCDRX of Ruthenium-picolylamine complexes synthesized from Ru-DMSO.

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References

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