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Chiral Ru(II) Schiff base complex-catalysed enantioselective epoxidation of styrene derivatives

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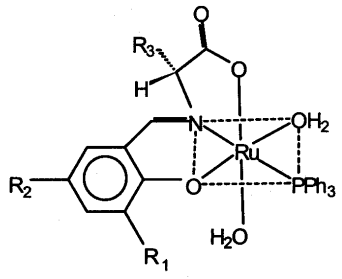
Ruthenium(II) chiral Schiff base complexes **1**–**5** and their precursor ligands derived from L-histidine with salicylaldehyde, 3-tert-butyl-, 3,5-ditert-butyl-, 3,5 dichloro- and 3,5-dinitrosalicylaldehyde are reported. Characterisation of the ligands and complexes was accomplished by various appropriate physico-chemical studies namely, microanalysis, IR-, UV-Vis-, ^{1}H, $^{31}P\{^{1}H\}$ NMR, CD spectroscopy, optical rotation, conductance measurement, and cyclic voltammetry. Complexes thus synthesised were used as catalysts for enantioselective epoxidation of styrene, 4-chloro-, 4-nitro, and 4-methyl styrene. Efficiency of the catalytic system was explored by varying the substituents on the ligand moiety of the catalysts and their effect on substituted styrenes was also studied. Iodosyl benzene turned out to be the oxidant of choice. Interestingly, catalyst **5** gave best results with 4-nitrostyrene suggesting that the higher electron density on the catalyst works better with electronically deficient substrates. The enantiomeric excess of the resulting epoxide was evaluated by gas chromatographic analysis.



1 : $R_1 = R_2 = NO_2$
2 : $R_1 = R_2 = Cl$
3 : $R_1 = R_2 = H$
4 : $R_1 = C(OH_3)_3$, $R_2 = H$
5 : $R_1 = R_2 = C(CH_3)_3$

R_3 = Histidine