**OCTAHEDRAL COMPLEXES FOR ENANTIOSELECTIVE CATALYSTS IN ORGANIC SYNTHESIS**

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**Abstract**. Hydrogen bond donor catalysis for asymmetric synthesis has attracted intense research efforts in recent years. Asymmetric catalysis which is mainly relied on chiral ligand is one of the available key technologies used to address the above mentioned challenges. Recently new class of catalyst based on octahedral complexes is gaining interest (Fig. 1). These complexes have been conveniently applied to wide varieties of enantioselective organic transformations where chirality is mainly controlled by octahedral metal centre. Cobalt (III) and/or iridium (III) complexes with 1,2-diphenylethylenediamine ligands have been successfully used for the enantioselective organic synthesis.Diastereomeric salts such as Λ-[Co((*S*,*S*)-dpen)3]3+ 3Cl– (Λ-(*S*,*S*)-**1**3+ 3Cl–) or Δ-(*S*,*S*)-**1**3+ 3ClO4– have been synthesized by the reactions of CoX2 (X = OAc, Cl) or Co(ClO4)2 with (*S*,*S*)-1,2-diphenylethylene­diamine. Large families of lipophilic salts Λ- and Δ-(*S*,*S*)-**1**3+ 2X–X'– (X/X' = Cl/BArf (BArf = B(3,5-C6H3(CF3)2)4), PF6/BArf, BF4/BArf, PhBF3/ BArf, Cl/BArf20 (BArf20 = B(C6F5)4), BArf/BArf, BArf20/BArf20, BF4/BF4, PF6/PF6) have been synthesized using anion metatheses. With aim to develop potent chiral-at-metal catalysts for asymmetric transformation, it is crucial to advance our understanding of the relationship between structural features and catalytic properties of these novel complexes. The recent development and our contribution in the field of octahedral chiral-at-metal catalysts will be discussed.



Figure 1 Representative Octahedral Chiral-at-Metal Catalyst.