



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student : M. Kannan

Roll Number : 10612222

Programme of Study : Ph.D.

Thesis Title: Studies Toward Copper-Catalyzed Asymmetric Nitroaldol and Iron-Catalyzed Thia-Michael/Aldol Cascade Reactions

Name of Thesis Supervisor(s) : Prof. T. Punniyamurthy

Thesis Submitted to the Department/ Center : Chemistry

Date of completion of Thesis Viva-Voce Exam : 02.06.2017

Key words for description of Thesis Work : Asymmetric Metal Catalyst, Tetradentate Salen, Salan, Salelan, Enantioselective Nitroaldol, and Trisubstituted Tetrahydrothiophenes

SHORT ABSTRACT

The thesis contains four chapters. Chapter I describes a brief literature survey on asymmetric metal catalysis utilizing chiral tetradentate salen, salan, salelan ligands and tridentate β -aminoalcohol derived ligands.

Chapter II focuses on the synthesis of chiral Cu(II)-complexes bearing salen, salan, salalen and salalan ligands and their application towards enantioselective nitroaldol reaction. The reaction is mild and afforded aryl, heteroaryl, naphthyl and alkyl β -nitroalcohols in high enantioselectivities at room temperature without any additives.

Chapter III presents the synthesis of chiral tetradentate salen ligand and tridentate β -aminoalcohol derived ligands for Fe-catalyzed enantioselective thia-Michael-aldol cascade reaction. The reaction proceeded readily between aryl, heteroaryl, alkyl chalcones and 1,4-dithiane-2,5-diol in the presence of Fe-catalyst to afford the corresponding trisubstituted tetrahydrothiophenes in good enantioselectivities.

Chapter IV demonstrates the synthesis of chiral β -aminoalcohol derived tridentate dendrimer and their application as a recoverable and recyclable catalyst has been demonstrated for enantioselective thia-Michael-aldol cascade reaction. The system provides the advantages of simplified product isolation, easy recovery and recyclability of the dendrimer Fe(III)-catalyst.