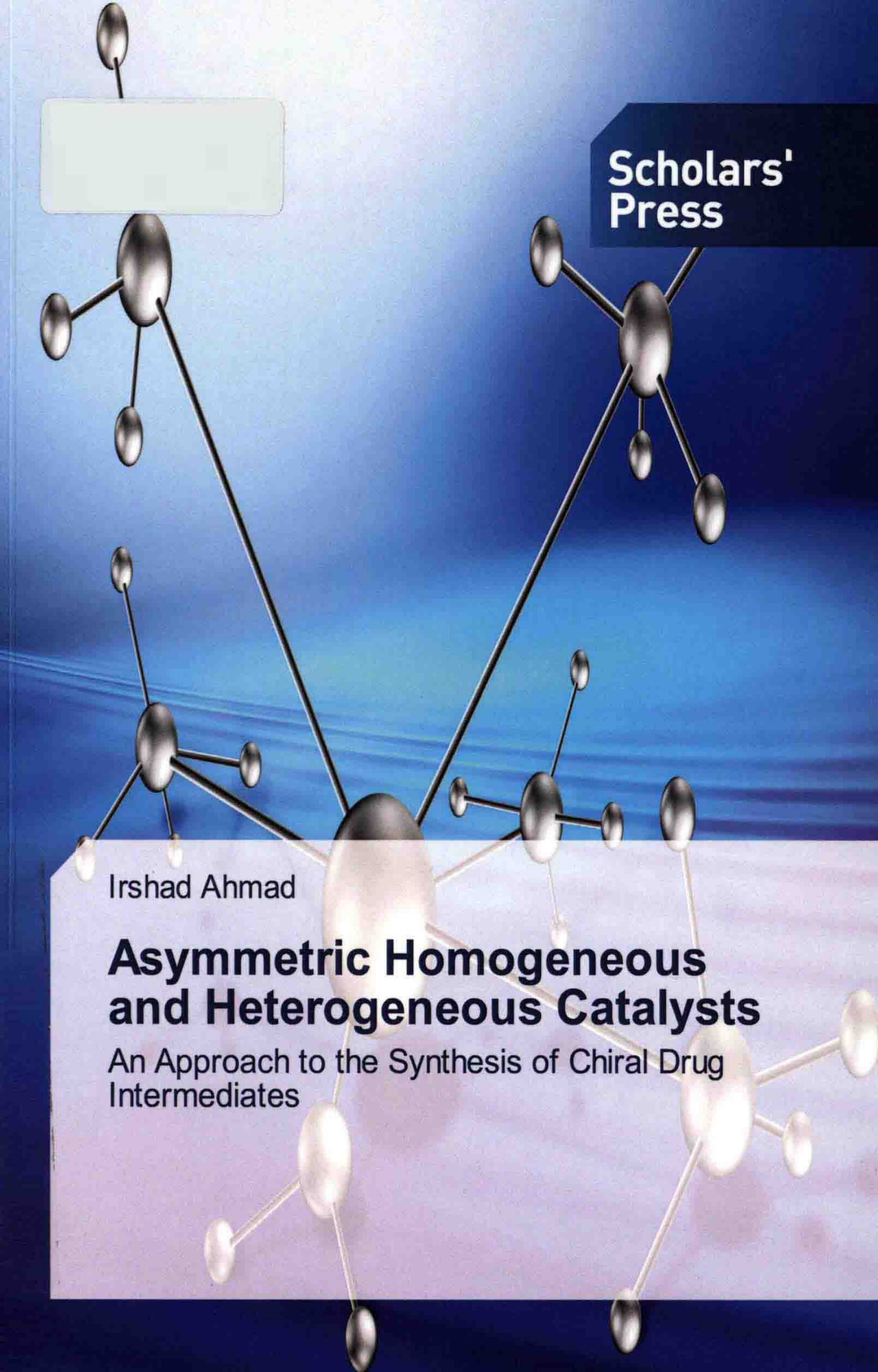

Scholars' Press

Irshad Ahmad

Asymmetric Homogeneous and Heterogeneous Catalysts

An Approach to the Synthesis of Chiral Drug Intermediates

Irshad Ahmad

Asymmetric Homogeneous and Heterogeneous Catalysts

An Approach to the Synthesis of Chiral Drug Intermediates

Scholar's Press

Impressum / Imprint
Bibliografische Information der Deutschen Nationalbibliothek: Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über http://dnb.d-nb.de abrufbar.

Bibliographic information published by the Deutsche Nationalbibliothek: The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at http://dnb.d-nb.de.

Coverbild / Cover image: www.ingimage.com

Verlag / Publisher:
Scholar's Press
ist ein Imprint der / is a trademark of
AV Akademikerverlag GmbH & Co. KG
Heinrich-Böcking-Str. 6-8, 66121 Saarbrücken, Deutschland / Germany
Email: info@scholars-press.com

Herstellung: siehe letzte Seite /
Printed at: see last page
ISBN: 978-3-639-51138-3

Zugl. / Approved by: Bhavnagar, Bhavnagar University, Ph.D Thesis 2006

Irshad Ahmad

Asymmetric Homogeneous and Heterogeneous Catalysts

Dr. Irshad Ahmad

Asymmetric Homogeneous and Heterogeneous Catalysts

An approach to the synthesis of chiral drug intermediates

Preface

The work embodied in this book comprises of six chapters. In chapter 1 the brief introduction of chiral catalysis with special emphasis on chiral epoxidation reactions with functionalized/ non-functionalized alkenes under homogeneous/heterogeneous system is discussed. This chapter also concludes with the scope and objectives of the present work.

Chapter 2 describes a general introduction about various physicochemical aspects of mesoporous molecular sieve materials. The different characteristic properties of these materials, their synthesis parameters, different approaches for surface-functionalization, characterisation techniques, and application as supports for different catalytically active transition metal complexes. Chapter 3 includes the synthesis and characterisation of dicationic chiral Mn^{III} salen complexes exchanged in montmorillonite clay by cation exchange process as active catalysts for enantioselective epoxidation of non-functionalized alkenes using NaOCl as oxidant. Chapter 4 consists of synthesis and characterization of chiral Mn^{III} salen complexes which were immobilized on Py*N*-O modified MCM-41 for enantioselective epoxidation of non-functionalized alkenes with NaOCl as oxidant. Chapter 5 includes synthesis of dissymmetric chiral Mn^{III} salen complex covalently bonded to aminopropyl modified MCM-41 and SBA-15 as efficient catalysts for the enantioselective epoxidation of non-functionalized alkenes with NaOCl as an oxidant Chapter 6 includes synthesis of dissymmetric chiral Mn^{III} salen complex and mesoporous material MCM-41 and SBA-15 of different porosity which was used to immobilize the chiral Mn^{III} salen complex as active catalysts for enantioselective epoxidation of non-functionalized alkenes. Methods and references have been placed at the end of these chapters for the sake of convenience.

Dedicated to my parents

and well wishers

for their affectionate blessing…

Acknowledgments

It's my great privilage to acknowledge my honourable research supervisor, Dr. (Mrs.) Rukhsana I. Kureshy. Her inspiration, invaluable guidance and criticism helped a lot to shape my views in proper perspective.

I am also indebted to Dr. S. H. R. Abdi and Dr. N. H. Khan, whose frequent appreciative comments and sensible guidance has helped me.

It is my profound privilege to express my gratitude to Dr. R. V. Jasra, Dr. H. C. Bajaj, Silicates and Catalysis Discipline and Dr. P. K. Ghosh, Director, Central Salt and Marine Chemicals Research Institute - Bhavnagar, who have always been encouraging.

I am also thankful to all Institute's staff members whose names although not mentioned individually here, but have always been ready to understand my problems and helped me in all possible manners. I am thankful to Department of Science & Technology (DST) and Council of Scientific & Industrial Research (CSIR)-New Delhi, for providing me financial assistance. in the form of project Assistant/Senior Research Fellowship.

My special and sincere thanks are reserved for my research colleagues and friends who have efficiently helped me. With core of my heart, I am thankful to my dear parents, wife and my well wishers whose encouragement and support have been a source of inspiration.

Last but not the least; I am thankful to the Almighty, who has provided me sound health and strength to complete this work. What I am and what I would be I owe to the Almighty for leading me the path of success.

(Irshad Ahmad)

List of Abbreviations

AAS	Atomic Absorption Spectroscopy
APTES	3-Aminopropyltriethoxy silane
BET	Brunauer-Emmett-Teller
BJH	Barrett-Joyner-Halenda
CMC	Critical Micelle Concentration
CP MAS	Cross Polarization Magic Angle Spinning
CTABr	Cetyltrimethylammonium bromide
CPC	Cetyl Pyridinium chloride
DCM	Dichloromethane
DDA	Dodecylamine
DRUV-Vis	Diffuse Reflectance Ultraviolet-Visible
ee	Enantiomeric Excess
FSM	Folded Sheet Materials
FTIR	Fourier Transform Infrared
GC	Gas Chromatography
HMM	Hybrid Mesoporous Material
HMS	Hexagonal Mesoporous Silica
HRTEM	High Resolution Transmission Electron Microscopy
ICP-AES	Inductive Coupled Plasma – Atomic Emission Spectrometry
LCT	Liquid Crystal Template
MCM	Mobil's Crystalline Material
MPTS	3-Mercaptopropyltrimethoxy Silane
NMR	Nuclear Magnetic Resonance

Py*N*-O	Pyridine *N*-Oxide
SBA	Santa Barbara Amorphous
SEM	Scanning Electron Microscopy
SLC	Silicatropic Liquid Crystals
TCP	Thermodynamically Controlled Product
TEM	Transmission Electron Microscopy
TEOS	Tetraethyl orthosilicate
TOF	Turnover Frequency
TON	Turnover Number
UV-Vis	Ultraviolet-Visible
XRPD	Powder X-Ray Diffraction