

CONTENTS:

LIST OF ABBREVIATIONS.....	i
LIST OF FIGURES	ii
LIST OF TABLES	vii
CHAPTER 1	1
INTRODUCTION	1
Objective of the present study.....	8
CHAPTER 2	9
GEOLOGICAL BACKGROUND.....	9
Krishna Province.....	10
Eastern Ghats Province (EGP).....	12
Jeypore Province.....	18
Rengali Province.....	18
Cratonic contact of EGB.....	19
EGB-Bastar Craton	19
EGB-Singhbhum Craton.....	20
EGB-Dharwar Craton	21
EGB and East Antarctica.....	22
CHAPTER 3	26
FIELD RELATIONS	26
Visakhapatnam domain.....	26
Phulbani Domain and North-Western part of EGP	30
CHAPTER 4	37
MATERIALS AND METHODS	37
Scanning Electron Microscopy (SEM)	37
Electron Probe Micro Analysis (EPMA).....	37
Xray Fluorescence (XRF) spectrometry	38
Inductively Coupled Plasma Mass Spectrometry (ICPMS).....	38
Inductively coupled plasma atomic emission spectroscopy (ICP-AES).....	39
Laser Ablated Inductively Coupled Plasma Mass Spectrometry (LA-ICPMS).....	39
Phase equilibria modeling using Perple_x.....	40
CHAPTER 5	44
PETROLOGY OF FELSIC GRANULITES.....	44

5.1 Charnockite	44
5.1.1 Petrography	44
5.1.2 Mineral chemistry	46
5.1.3 Metamorphic reactions.....	47
5.1.4 Geothermobarometry	48
5.1.5 Whole rock chemistry	50
5.1.6 Phase equilibria analysis	52
5.1.7 Zircon trace element and REE chemistry.....	53
5.2 Granite.....	54
5.2.1 Petrography	54
5.2.2 Whole rock geochemistry	55
5.3 Monzosyenite.....	56
PETROLOGY OF MAFIC GRANULITE	68
6.1 Silicate-oxide phases.....	68
6.1.1 Two pyroxene granulite.....	68
6.1.2 Garnet-pyroxene granulite	70
6.2 Oxide-sulphide phases	71
6.3 Sulphide-sulphate phases	72
6.4 Mineral Chemistry	72
6.4.1 Two pyroxene granulite.....	72
6.4.2 Garnet-pyroxene granulite	74
6.5 Mineral reactions	74
6.6 Geothermobarometry	78
6.7 Oxygen fugacity.....	80
CHAPTER 7	88
GEOCHRONOLOGY	88
7.1 Felsic granulites	88
7.1.1 Charnockite:.....	88
7.1.2 Monzosyenite.....	92
CHAPTER 8	95
DISCUSSION	95
8.1 Role of orthogneisses in the context of UHT metamorphism of the EGP	95
8.2 Geochemical evolution of the felsic gneisses and its tectonic implication	97

8.3 Charnockite magmatism in EGP and Rayner Province.....	99
8.4 Diversity of felsic magma: granite vs. charnockite.....	103
8.5 Mafic magmatism in the EGP	105
8.6 Fluid evolutionary history of the lower crust.....	106
8.7 Fluid evolution in the shallow crustal level	110
8.8 Juxtaposition of EGP against the cratonic India and the effect of hot orogeny on cold lithosphere	111
References.....	115