Contents

Title page  i
Acknowledgements  iii
Publications  vi
Abstract  viii
Contents  xi

Chapter 1  Introduction  1
  1.1 A Brief Historical Background  2
  1.2 Magnetoelectric Coupling in Multiferroics  4
  1.3 Microscopic Origin of Ferromagnetic Ferroelectrics  6
  1.4 Types of Multiferroics  7
    1.4.1 Single Phase Multiferroic Compounds  8
    1.4.2 Multiferroic Composite Systems  17
  1.5 Motivation of the Thesis  21
  1.6 Thesis Organization  22

Chapter 2  Experimental techniques  34
  2.1 Materials Fabrications  34
    2.1.1 Chemical Synthesis Route: Bulk Material  34
    2.1.2 Pulsed Laser Deposition (PLD) Technique: Thin Films  35
    2.1.3 Template Assisted Wet Chemical Liquid Phase Deposition Techni-  
      nique: Nanowires/Nanotubes  37
  2.2 Sample Characterization  40