List of Figures

1.1 Hot press method of sample preparation. ........................................... 23
1.2 Vector representation of Impedance. ................................................. 27
1.3 A typical Cole-Cole plot observed for SPEs and NCSPEs. ................. 29

2.1 Chemical structure of PEG 2000 ....................................................... 39
2.2 Circuit used with lock-in-amplifier for conductivity measurements ........................................... 42
2.3 Typical Cole-Cole plot for one of our sample .................................... 44
2.4 X-ray diffractograms of PEG and LiBr compared with that of SPEs ...... 46
2.5 IR spectra of PEG and PEG based SPEs ............................................. 49
2.6 NMR spectra of some SPEs and NCSPEs .......................................... 52
2.7 Room temperature ionic conductivity as a function of salt concentration 54
2.8 Enhanced ionic conductivity at room temperature with addition of nanoparticles ........................................................................................................... 56
2.9 Temperature dependence of ionic conductivity. ................................... 58

3.1 Circuit used with FRA for conductivity measurements ..................... 68
3.2 Photograph showing the sample holder of the conductivity rig. .......... 70
3.3 Photograph showing the complete experimental setup based on FRA for ionic conductivity measurements. ................................................................. 71
3.4 X-ray diffractograms of PEG, PEG based SPEs and NCSPEs .......... 73
3.5 Infrared Spectra of SPEs and NCSPEs ................................................. 75
3.6 Concentration dependence of ionic conductivity ................................ 77
3.7 Nanoparticle concentration dependence of ionic conductivity .......... 78
3.8 Temperature dependence of ionic conductivity ................................... 80
3.9 DLC dependence on salt concentration ............................................... 83
## LIST OF FIGURES

3.10 DLC dependence of temperature 

4.1 X-ray diffractograms of SPEs compared to pure salt and polymer

4.2 Infrared Spectra of NCSPEs

4.3 Concentration dependence of ionic conductivity

4.4 Nanoparticle concentration dependence of ionic conductivity

4.5 Temperature dependence of ionic conductivity

4.6 DLC dependence on salt concentration

4.7 DLC dependence on temperature