Preface

The most commonly used experimental technique to characterize the dynamics of mobile ions in disordered ionic solids is the electrical relaxation measurements. This thesis is on the experimental and theoretical investigations of the electrical relaxation process in disordered ionic solids both in the frequency domain and time domain. The thesis divided into seven chapters and the contents of the each chapters are as follows.

Chapter 1 gives the general description of the interdisciplinary field of fast ion conductors. In Chapter 2 a brief review and up to date survey of the models on ion conductivity and relaxation behavior in ion conducting disordered solids including scaling behavior are presented. Synthesis, characterisation and electrical measurements and analysis are presented in Chapter 3. The temperature and compositional dependence scaling analysis in ac conductivity also present in this chapter. Chapter 4 is on the Monte Carlo simulation on two-dimensional disordered lattice with different nearest neighbor interactions strength and concentration of the mobile ions. The derivation of anomalous relaxation function and its important features are provided in Chapter 5. The details of the fabrication of a newly designed discharge unit and its performance on silver based solid state batteries are presented in Chapter 6. The salient features of the present work are summarised in Chapter 7.

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