

PREFACE

Materials Science is primarily concerned with the search for basic knowledge about the internal structure, properties, and processing of materials. It covers all materials known to men, both natural and man made (or modified by humans). Over the last fifty years or so, a great deal of progress has been made in understanding the scientific reasons for the various aspects of the behaviour of different materials. It has been well understood now that the properties of materials have a direct relationship with their structure.

'Ferrites' are ferrimagnetic oxide materials having many applications in electronic and microwave devices. It has been established that the properties of ferrites depend to a great extent on their microstructural characteristics apart from other factors. In the present work an effort is made to establish correlation between the ferrite properties and their microstructure. The work involves the processing and the studies on electrical and magnetic properties of some Co-Zn mixed ferrites and their microstructure.

The subject matter of this thesis is presented in Six chapters. Chapter I gives an introduction to historical developments of ferrites and discusses their structure, properties and applications. It also includes the orientation of the present work. The preparation of Co-Zn ferrites by ceramic method and their characterization with the help of X-ray diffraction is dealt with in chapter II. Conduction in ferrites and the experimental measurement of their electrical resistivity is the subject matter of chapter III. Chapter IV discusses the necessary theoretical background regarding magnetization in ferrites and the results of actual magnetization measurements on our samples. IR study of the samples is also included in this chapter. Chapter V is devoted to the study of ferrite microstructure. The results obtained from electrical conductivity measurements and magnetization measurements are discussed in the light of Ceramic microstructure obtained from SEM. Summary and conclusions are given in the last chapter.

The theoretical as well as experimental results are illustrated with appropriate figures and tables wherever necessary. A list of references is incorporated at the end of each chapter, and lists of figures and tables are given at the beginning of the dissertation.

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