Ferrites are technologically important materials. Nickel-Zinc ferrites have many applications in telecommunication systems for which thermal variation of initial permeability should be linear and minimal. This can be achieved by adding impurities like Cr$^{3+}$ and Al$^{3+}$. These additives also improve the temperature coefficient of initial permeability and electrical resistivity which are useful in high frequency applications. Therefore, an attempt is made to study Ni-Zn ferrite substituted with aluminium and chromium.

The first chapter opens with brief account on related theories on electrical and magnetic properties of ferrites. At the end of this chapter orientation of present work is given. References are given at the end of the chapter.

In the second chapter methods of preparation of ferrites, X-ray diffraction studies and microstructural analysis of the samples have been reported in three sections.

In chapter three study of electrical properties like d.c. resistivity and frequency & temperature dependence of dielectric constant, loss factor, relaxation time are reported in Section 3A and Section 3B respectively.

The fourth chapter is devoted to study of magnetic properties. This study has been reported in four sections.
First section gives studies on magnetic hysteresis. Section section deals with the a.c. susceptibility studies. The last two sections deal with the initial permeability and Curie temperature measurements.

References are given at the end of each section.

Illustrative figures are given for the experimental and theoretical results.

Summary and conclusions are given in the fifth chapter.