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## MAGNETIC PROPERTIES OF Co-Bi FERRITE POWDERS AND THIN FILMS BY A SOL-GEL METHOD

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### Introduction

Cobalt ferrite,  $\text{CoFe}_2\text{O}_4$ , is a well-known hard magnetic material which has been studied in detail due to its high coercivity (5400 Oe) and moderate saturation magnetization (about 80 emu/g) as well as its remarkable chemical stability and mechanical hardness [1]. These magnetic and physical properties of Co ferrite enable the development of high density magnetic recording media, especially Co ferrite films can be used for contact recording media that will ultimately be required in the near future [2]. For the practical application of Co ferrite powders and thin films such as magnetic recording and magneto-optic recording media, a sol-gel pyrolysis method is introduced as an attractive alternative to some of the other deposition techniques that have been used to grow Co ferrite powders and thin films. The advantage of this chemical route is not only the lower annealing temperature necessary for the crystallization process, but also the small grain size of ferrite obtained that will be required for high-density magnetic recording media.

In this study, a sol-gel procedure was used for the growth of ultra-fine Co-Bi ferrite powders and thin films. The thermal decomposition characteristic of gel system with temperature was studied by a thermogravimetric and differential thermal analysis (TG-DTA). Their magnetic and structural properties were characterized using an x-ray diffractometer, atomic force microscopy (AFM), Mössbauer spectroscopy, and vibrating sample magnetometer. Compositional analysis was measured by using Rutherford back scattering spectroscopy (RBS).