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ABSTRACT

The development of advanced motors and generators for airspace and special power applications, requires the use of soft magnetic materials which have high mechanical strength. In the search for these high strength soft magnetic alloys a great number of investigations have been done in the last decade, and as a consequence, important advances have been obtained. The Fe-Co alloys present excellent magnetic properties and have been indicated as candidate material for these power applications. In this work a brief review of the work published in the last thirty years in Fe-Co-V alloys is presented, and new routes for research on Fe-Co-X and Fe-Co-V-X alloys (X is an alloy element) are pointed.

1. INTRODUCTION

Interest on the investigation of binary FeCo alloys has been noticeable since the

discovery of Preuss (1) and Weiss (2) that alloys of this system present the highest saturation magnetization of ferromagnetic materials. In 1926, Elmen (3) has patented the equiatomic FeCo alloy, named Permendur. However, severe restrictions on the fabrication of thin plates of that alloy were faced due to its extreme fragility. White and Wahl (4) in 1932 solved this difficulty with the addition of 2% V to the equiatomic alloy with excellent results. This particular alloy was named 2V-Permendur, or Supermendur when high purity Fe and Co are used as starting material for the fabrication of the alloy.

The iron-cobalt alloys constitute a family of magnetic materials that can present properties characteristic of soft or hard magnetic materials by changes in the alloy composition or by thermal-mechanical treatments. In the present work, attention will be focussed on soft Fe-Co-2%V alloy with good mechanical strength. These