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Powder-Metallurgical Studies on Ferrite Manufacturing Process

Takashi YAMAGUCHI*

The ultimate aim of the present investigation essentially concerns with obtaining useful informations for the control of ferrite manufacturing process and further, with improving producibility.

The thesis contains two parts. In the first part, calcination, ball-milling and firing processes are studied from physico-chemical and powder-metallurgical points of view, and effects of important factors involved in each unit operation on the properties of ferrite powder as well as on the ferrite product are discussed. It is shown that the properties of sintered final products, i.e. fired density and micro-structure, are closely related to each unit operation in the manufacturing. As one of the attempts for the evaluation of ferrite manufacturing performance, the ferrite powder obtained by calcining and ball-milling the constituent oxide raw material mixture was chosen. Some powder parameters of the ferrite powder were found to be useful not only for the evaluation of the calcination and ball-milling but also for the prediction of pressing and firing performance.

On the basis of these results, magnetic characteristics of the final product could be estimated from the ferrite processing conditions, provided that the chemical composition of the product be fixed.

It is also shown that the tap density and agglomeration state of the ferrite powder are most important and convenient parameters for the criteria of the manufacturing performance.

The second part concerns with application of these results to practical problems and contains the following items :

- 1) Relation between microstructure and magnetic characteristics of Mn·Zn-ferrite.
- 2) Effects of ferrite powder properties on firing performance and magnetic characteristics of Ni·Zn-ferrite.
- 3) Effects of powder properties of principal raw material(Fe_2O_3) on the firing performance and magnetic characteristics of Cu.Zn-ferrite.

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