

Magnetic Properties of Woodceramics

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Abstract

Magnetic measurements were performed on Woodceramics from room temperature up to 850°C. The magnetization curves of Woodceramics showed a local maximum and a local minimum for the magnetic field. It is suggested that the usual diamagnetism and the very small ferromagnetism are coexisting. The ferromagnetic components of them vanished at 780°C, that is the same Curie temperature of pure iron. We detected iron in the woodceramics by chemical analysis.

Key words: Woodceramics, ferromagnetism, diamagnetism, magnetization

1. Introduction

All matters respond, more or less, to an external magnetic field. This response appears as the magnetization of matter. From the relation of magnetization to an external magnetic field, the matter is classified as ferromagnetic substance, paramagnetic substance or diamagnetic substance.

In ferromagnetic substance, the magnetization is great and the characteristic hysteresis loop is observed in the magnetization curve. The magnetization of paramagnetic substance is proportional and that of diamagnetic substance is inversely proportional to an external magnetic field. These magnetization are very small.

Woodceramic is a carbon material that is produced by impregnating phenol resin into wood and then baking it in an evacuated furnace. So the magnetism of Woodceramics is essentially diamagnetism. However, only a very small quantity of mineral is contained in the natural wood material. As in fiberboard, processed wood material may contain magnetic impurities. It is considered that one of these, as iron or iron oxide, has an effect on the magnetization of woodceramics.

We have found curious magnetization curves for woodceramics through magnetic measurements and report as follows.

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