

CHARACTERIZATION OF AL₂O₃ DISPERSED FERRITE PRODUCED BY CONTROLLED MILLING

HWANG Seung J.

Daejin University, Seoul, Republic of Korea

Abstract

4 volume % of nano sized Al₂O₃ dispersed α -Fe powder materials with nanocrystalline was produced by simple milling with a mixture of the pure Fe, Al, and magnetite (Fe₃O₄) powders as a starting powder. The milled powders were hot pressed (HPed) at the elevated temperature, followed by hot isostatic press (HIP) for the further densification. The microstructure of the consolidated materials was characterized by standard metallographic techniques such as TEM (Transmission Electron Microscopy), STEM-EDS (Energy Dispersive Spectroscopy), and XRD (X-ray Diffractometer). Mechanical properties of the materials were determined by compressive yield test and micro Vickers hardness test at room temperature. The grain size estimation was attempted for the materials by XRD, using the scherrer's formula and TEM pictures. The microstructure of the materials was comprised with a mixture of a homogeneous distribution of Fe and Al₂O₃ nano grains. The 0.2% off-set yield strength and micro Vickers hardness of the materials were as high as 824 ± 39 MPa and 3.70 ± 0.1 GPa, respectively.

Keywords: Milling, TEM, XRD, powder

Author did not supply full text of the paper/poster.