

# Characteristics of Fe-yttria composites fabricated by powder metallurgy method

## Abstract

This study is focused on fabricating and characterizing iron (Fe) composites prepared by powder metallurgy route reinforced with varying weight of Yttria ( $Y_2O_3$ ). Composites were prepared based on 5 wt. % to 15 wt. % of reinforcement powder with particle size ranging from 1- 10 $\mu$ m. Pure Fe matrix composites were also prepared for comparison purpose. This paper will report the microstructure, bulk density and micro hardness values of the composites. Powder characterization and microstructures of the composites were examined using Scanning Electron Microscope (SEM) which indicated homogenous distribution of reinforcement particles in the metal matrix. Bulk density of the composites was calculated using standard Archimedean method showing decreasing values as the weight percentage of  $Y_2O_3$  increases. Micro- hardness was measured using micro-Vickers hardness instrument. The data obtained shows that the Fe- $Y_2O_3$  composites samples possessed superior hardness value with the increasing quantity of reinforcement compared to the unreinforced Fe composite.