

Effect of heating rate on microstructure and properties of the iron-chromium reinforced with alumina particle produced via microwave sintering

Abstract

The application of microwave sintering to metallic materials offers better mechanical properties over conventional sintering method. In this paper, the effect of heating rate on the microstructure and properties of the sintered 84Fe-11Cr-5Al₂O₃ composite was investigated. Sintering was carried out in a tubular microwave furnace HAMiLab-V3 under N₂ atmosphere. The heating rates were selected between 10°C/min to 60°C/min with increment of 10°C/min. A study of microstructure and physical properties was carried out on sintered samples. The results showed that the optimum heating rate was 20°C/minute. It was observed that, relative density, porosity and hardness decreased as heating rate higher than 20°C/minute.

Keywords — Hardness, heating rate, microwave sintering, porosity, relative density.