

Optimization of Sintering Temperature on Microwave Sintering of the Composite Iron-Chromium Reinforced with Alumina Particles

Abstract

Microwave sintering technology has become attractive and gained interest among material researchers due its capability and advantages over conventional sintering. Since two decades ago, intensive researches on microwave sintering have been carried out to sinter ferrous and non ferrous material purposely to produce composites with enhanced properties not achievable via conventional sintering. In this research, the effect of sintering temperature 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 sintering temperatures were selected between 1100°C to 1400°C with increment of 100°C. A study of microstructure and physical properties was carried out on sintered samples. It was observed that, relative density and porosity was slightly changed with increasing sintering temperature and hardness increased tremendously at sintering temperature of between 1300oC to 1400°C.However, the results showed that the optimum sintering temperature was at 1400°C.

Keywords; Density, Hardness, Microwave Sintering, Porosity, Powder Metallurgy, Reinforced