

Densification Behaviors of Fe-TiC System during Spark Plasma Sintering

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Abstract

The SPS process is a synthetic technique which makes sinter-bonding possible at a lower temperature in a shorter sintering time and then becomes finer grain size than conventional sintering methods.

Fe-TiC system is relatively light material one third of tungsten carbide and less than a half of tool steel in weight. And then it gives reasonable price of Fe-TiC system due to high mass effect with low density and relatively low cost of changing tools and bearings etc. Fe-TiC system can be machined easily by conventional equipment.

In the present work, SPS was conducted in the temperature range from 1000°C to 1150°C for 10min at constant heating rate and pressure. And then, physical properties and grain size after sintering were evaluated at various Fe contents.

Sintering of MA956 Powder by SPS and Strengthening by Addition of W and Mo

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Abstract

The sintering way of SPS and effect of W and Mo on the properties of MA956 was investigated. The powders become amorphous and grain size is less than 40 nm after MA in a planetary milling machine for 48h with a milling rate of 280r/min. When SPS sintering temperature is above 900°C, sintered compact density is above 99.1% and nearly full. And the alloy grain size is below 0.7μm. The addition of 3%wt W/Mo can increase pressure strength of room and 800°C, but its ductility decrease somewhat. Element W is better than Mo in improvement of high temperature relaxation behavior.