

عنوان مقاله:

Role of Ti_3AlC_2 MAX phase on characteristics of in-situ synthesized TiAl intermetallics. Part I: sintering and densification

محل انتشار:

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خلاصه مقاله:

Five TiAl– Ti_3AlC_2 composite samples containing (۱۰, ۱۵, ۲۰, ۲۵ and ۳۰ wt% Ti_3AlC_2 MAX phase) were prepared by spark plasma sintering technique at ۹۰۰ °C for γ min under ۴۰ MPa. For this purpose, metallic titanium and aluminum powders (aiming at the in-situ formation of the TiAl matrix phase) were ball-milled with predetermined contents of Ti_3AlC_2 MAX phase, which already was synthesized using the same metallic powders as well as graphite flakes. Displacement-time-temperature variations during the heating and sintering steps, displacement rate versus temperature, displacement rate versus time, and densification behavior were studied. Two sharp changes were detected in the diagrams: the first one, ~۱۶ min after the start of the heating process due to the melting of Al, and the second one, after ~۳۵ min because of the sintering progression and the applied final pressure. The highest relative densities were measured for the samples doped with ۲۰ and ۲۵ wt% Ti_3AlC_2 additives. More Ti_3AlC_2 addition resulted in decreased relative density because of the agglomeration of MAX phase particles.

کلمات کلیدی:

In-situ TiAl, Ti_3AlC_2 MAX phase, Spark plasma sintering, DTT graphs, Densification

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