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Synthesis of Carbide-Aluminide Cermets

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ABSTRACT

TiC-FeAl and TiB_2-FeAl composites have been combustion synthesized from mixtures of the elemental powders of titanium, carbon, aluminum, iron, and boron. When the powder mixtures were heated in an argon atmosphere to approximately 950 K, an abrupt increase in temperature occurred, indicating that the combustion synthesis reactions occurred in the powder mixture. The metallographic investigations and chemical analyses revealed that TiC particle dispersed FeAl alloys and TiB_2 particle dispersed FeAl alloys were produced. As the volume fractions of the TiC particles and TiB_2 particles increased, the Vickers hardness of the sample increased dramatically. The TiB_2 particle dispersion was more effective at increasing the hardness of the sample.