EFFECT OF ALLOY COMPOSITION ON MICROSTRUCTURE EVOLUTION DURING DENISFICATION OF TiC-Ni_3Al COMPOSITES,

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TiC-Ni_3Al composites are under development for application in diesel engines because of desirable physical properties. Powder compacts with binder contents from 30-50 vol. % were fabricated by reaction sintering with fine elemental powders to form Ni_3Al alloys in-situ. Densification was inhibited by alloying additions of Cr or Zr and enhanced by Mo or Si. Additions of Ti, Fe, or W had no significant effect on densification behavior. The final microstructure consisted of a 'core-rim' structure with TiC cores surrounded by (Ti,W,Mo)C rims. Grain sizes of the TiC increased with binder content and temperature. Preferred orientation of the Ni_3Al binder phase was evident due to very large grain sizes on the order of millimeters.

Research sponsored by the Heavy Vehicle Propulsion System Materials Program, DOE Office of Transportation Technologies, under contract DE-AC05-96OR22464 with Lockheed Martin Energy Research Corp.