FGM FABRICATION BY SURFACE THERMAL TREATMENTS OF TiC-Ni_3Al,

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TiC-Ni_3Al composites are under development for wear applications in diesel engines. Both laser and infrared surface treatments were used to modify the near-surface microstructure and to attempt to refine the grain size of the TiC. These treatments are characterized by extremely high heating and cooling rates. It was found that during laser treatments the near-surface temperatures are well above the melting point of the Ni_3Al. Solution-reprecipitation processes take place and these results in dendritic growth of the TiC grains. The heat affected zone extended to about 500 µm below the surface. Increases in the indent microhardness were observed, which should improve the wear resistance of the composites.

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