عنوان مقاله:

Fabrication of hybrid nanocomposite coating from Ti-Al-C powders mixture on Ti substrate by means of mechanical alloying

محل انتشار:

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خلاصه مقاله:

In the current investigation, mechanical alloying technique was utilized to produce a nanocomposite coating from elemental powders of Ti, Al and C on Ti substrate. The formation of coating during mechanical alloying was the results of repetitive cold welding and fracturing of powder particles with each other and with hard specimen surface due to ball-powder-substrate impacts. In this regard, X-ray diffraction (XRD) analysis and scanning electron microscopy (SEM) were employed to investigate phase, microstructural and morphological evolutions. At early stages of milling, Al was cold welded to the milling medium and the substrate. By increasing milling time, Al, Ti and C formed a coarse grain lamella structure which eventually was refined into the nanometer scale. The final Tigrain size after 12 h milled sample was estimated to be around 20 nm. The sample milled for different time was subjected to heat treatment at 900°C for 90 min. Nano scale AlTiC, AlTiz, and TiC phases were detected after heat treatment. The .approximate grain sizes of AlTi2C and AlTi2 after 12 h. milling was 35 nm while that TiC phase was about 20 mm

کلمات کلیدی:

Mechanical alloying, coating, intermetallic compounds, nanocomposite