عنوان مقاله:

FORMATION OF STEELITiCNANO-COMPOSITE SURFACE LAYER ON MILD STEELUSINGFRCTION STIR PROCESSING

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خلاصه مقاله:

In this study, fiction stir processing was employed to produce nano-composite surface layer on mild steel. Nanosized TiC powder was introduced to the stir zone by means of a pre-made groove on the workpiece surface. A tungsten carbide tool was used to plasticize the mild steel substrate. FSP parameters such as tool rotation and substrate advancing speeds were adjusted to mix TiC powder with the plasticize matrix. Composite surface layers were formed containing TiC clusters. Increasing the ratio of tool rotation to substrate advancing speed resulted in the break-up of TiC clusters. A steel/TiC nano-composite surface layer with uniform dispersion of nano-sized TiC powder was achieved using a tool rotation and substrate advancing speed of 1120 rpm and 31.5mm/s, respectively. The nano-composite surface layer exhibited a micro hardness value of about three times of that of the as-received mild steel substrate; this is attributed to the presence of hard TiC ceramic reinforcements in a matrix of refined acicular-type ferrite.

کلمات کلیدی:

FSP, Nano-composites, Microstructure, Hardness

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