

عنوان مقاله:

Effect of Different Nanoparticles and Friction Stir Process Parameters on Surface Hardness and Morphology of Acrylonitrile Butadiene Styrene

محل انتشار:

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تعداد صفحات اصل مقاله: 6

نویسندگان:

Mahsa Daryadel - *Mechanical Engineering, Urmia Univeristy*

Milad Moradian - *Mechanical Engineering, Urmia University*

Rezgar Hasanzadeh - *Mechanical Engineering, Urmia University*

Taher Azdast - *Mechanical Engineering, Urmia University*

خلاصه مقاله:

In the present study, the effect of material and process parameters on the morphological and hardness properties of friction stir process (FSP) acrylonitrile butadiene styrene (ABS) were investigated. For this purpose, firstly ABS polymeric sheets were injection molded. Then a slot with predetermined depth and width was created on sheets using a horizontal milling machine. Nano type (nanoclay, nano Fe₂O₃, and multi-walled carbon nanotube), rotational speed and transverse speed of FSP tool was selected as input paramete of the experiment in three levels. Design of experiments was carried out according to Taguchi L9 orthogonal array. Then aforementioned three types of nano particles were added to the slots and the specimens were friction stir processed in different conditions using a simple cylindrical tool on a vertical milling machine. In the next step, the hardness tests were conducted on the FSP sections of the samples. It was found that addition of nano particles causes an increase in the surface hardness of polymeric samples. Also, it was observed that the samples with multi-walled carbon nanotubes as a reinforcement had the highest value of hardness. Scanning electron microscopy (SEM) tests were carried out on the FSP sections of specimens. Obtained SEM images indicated that processing conditions have a significant effect on the nano particles dispersion in the polymeric matrix.

کلمات کلیدی:

Friction Stir Process, Acrylonitrile Butadiene Styrene, Multi Walled Carbon Nanotubes, Shore Hardness

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