

Nanocomposites and nanomaterials

Novel heating element based on polymer nanocomposites for resistance welding of plastics

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Resistance welding is one of the most popular welding techniques for thermoplastics nowadays. This technique uses electrically resistive implant sandwiched between the bonding surfaces of the laminates to provide the necessary heat to the joint. When the current flows through the heating element, the heat generated according to the Joule's Law.

Present work describes a new method of the resistance welding of thermoplastic polymers using electroconductive heating element. The heating elements were prepared by incorporation of carbon black (CB) into high-density polyethylene (HDPE) matrix with different variety of volume fraction of the conductive fillers [1].

To evaluate electroconductive properties of the heating elements, they were tested by passing current through it with various values of input voltage [2]. Received information served as an indicator of maximum temperature that can be achieved on specified voltage.

1. *Carmona F., Mouney C.* Temperature-dependent resistivity and conduction mechanism in carbon particle-filled polymers // *J. Mater. Sci.*-1992.-**27**.-P. 1322-1326.
2. *Young Gyu Jeong, Ji-Eun An.* Effects of mixed carbon filler composition on electric heating behavior of thermally-cured epoxy-based composite films // *J Composites.* – 2014. – 56, - P. 1-7.