

عنوان مقاله:

Experimental Investigation of Injection Pattern Effect on Tensile Strength of PLA Material in FDM Processes

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خلاصه مقاله:

The Fused deposition modeling process (FDM) is the most widely used, simplest and cheapest method of additive manufacturing and 3D printing. This method, which is based on the extrusion of molten thermoplastic filament, is of interest in various industries for rapid prototyping and the construction of relatively complex geometries without the need for molds and additional equipment. One of the most important challenges of the FDM process is the strong dependence of mechanical and physical properties on printing parameters. The aim of this research is to investigate the effect of the basic printing parameters of injection mold (in two linear and concentric patterns) with a nozzle diameter of 0.4 mm on the tensile strength. Examining the results of the tensile strength of the samples showed that the tensile strength can be changed by changing the injection pattern (from 28.1MPa to 27.8MPa at 190 °C). The highest tensile strength is related to the linear injection pattern and the lowest tensile strength is related to the concentric injection pattern. Also, the scanning electron microscope images of the fracture surface of the printed samples showed that all the printed samples have micro holes at the interface between the layers, and removing these micro holes is inevitable due to the nature of FDM process.

کلمات کلیدی:

additive manufacturing, 3D printing, injection pattern, tensile strength

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