Surface and Mechanical Properties of 3D-Printed Biocompatible ABS Polymers

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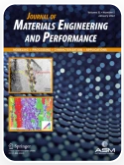

Journal of Materials Engineering and Performance

Aims and scope

Submit manuscript

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Abstract

Acrylonitrile butadiene styrene (ABS) is a commonly used copolymer. It is widely employed, especially in additive manufacturing (AM), a newly developed and open-ended production method. It can be used in medical applications due to its biocompatible behaviour and performance characteristics. Though there are a few disadvantages of the AM, improving the sample's mechanical properties are possible by applying pre-processing to the filament (dehumidification) or choosing the correct printing parameters. Nevertheless, surface quality is limited regardless of the mechanical properties and printing parameters. For this reason, finishing, called post-processing, is often preferred. ABS post-process application is made with an acetone vapour atmosphere. However, this application is a chemical process. This chemical process could change the properties of the ABS sample. This paper investigates the effect of post-processing on the ABS sample. According to reference samples, the change in porosity values was measured from 30 to 60%. In addition, as the post-processing time increased, the hue of the samples shifted from yellow to blue and from dark to light. Further, increased acetone vapour exposure decreased the bending and tensile test results. The impact of acetone vapour exposure on the toughness of ABS polymer has yielded conflicting results.