ANALYSIS OF THE MATERIALS USABILITY IN ADDITIVE PRODUCTION TECHNOLOGIES

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Abstract

Nowadays it is in growing usage of additive production technologies, especially the FDM (Fused Deposition Modeling) method. The most commonly used materials in 3D printing are ABS (Acrylonitrile butadiene styrene) and PLA (Polylactic acid). ABS is a thermoplastic polymer of petrochemical origin, while PLA is a material that is most often fabricated by fermenting vegetable corn starch or sugar cane. PLA has a not so much unpleasant odor and is considered a biodegradable material, which is also the basic properties of this material. It melts at 190°C to 230°C. It is most often used for prototyping parts production. Since the material is biocompatible to the human body, various implants are made from it. Unlike PLA, ABS requires a higher melting point than PLA, usually 210°C to 260°C. It is used in 3D printing, instruments, sports equipment, parts that need to be resistant to falls, knife handles, mobile phone holders for cars, toys, etc. As they have similar values of tensile strength, both materials are adequate for prototype application, provided ABS has higher flexural strength and better elongation before cracking. Unlike PLA, ABS can withstand high dynamic loads. Based on the σ-ε diagram, it can be concluded that ABS has a larger plastic reserve than PLA.

Keywords

FDM, PLA, ABS, Additive production

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