3rd International Conference on

Materials Science and Engineering

October 07-08, 2019 | Frankfurt, Germany

Guessasma S[1]

Belhabib S[2]

[1]INRA, France

[2]Université - IUT de Nantes, France

Fused deposition modelling of acrylonitrile styrene acrylate and related mechanical performance

Fused Deposition Modelling (FDM) is among the affordable additive manufacturing techniques used to to process complex three-dimensional designs with weak dependancy on the production tool. Well-known feedstock materials such as ABS, PLA were successfully printed using FDM. Despite the increasing research effort directed towards FDM, there is still a gap in the literature about the printability of some materials such as the one considered in this study, namely acrylonitrile styrene acrylate (ASA). The effect of FDM processing conditions is considerted on the thermal and mechanical properties of ASA. The feedstock material is characterised using differential scanning calorimetry and tensile testing. Infra-red measurements are used to capture the thermal signature of the ASA filament during laying down process for various printing temperatures. Both X-ray micro-computed tomography and mechanical testing are undertaken on printed ASA as a function of the process conditions. Finite element computation is considered to preodict the perfromance of the printed material and to gain further insights on the deformation mechanisms. The experimental results show that the printability of ASA is reduced to a narrow range of printing tempratures. A loss of mechanical performance is also observed, which is found dependant on the printing temperature. The numerical results demontrate that the observed mechanical perroamnce is reflected by the nature and extent of defect generated by the processing.

Speaker Biography

Guessasma S is a mechanical engineering scientist, a by-fellow of the Churchill college, University of Cambrige, UK, and a high-end foreign expert in China. He is presently a senior scientist at INRA (France) conducting a research activity in the field of additive manufacturing of biosourced materials. He has a key interest on hot topics in mechanical engineering, processing and materials science. He has several contributions related to the microstructural interpretation of material performance, mechanical modelling, image analysis, and in-situ experiments. He published over 120 papers in different research fields.

e: sofiane.guessasma@inra.fr

Notes: