



VIRTUAL SEMINAR

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Development and characterisation of highly filled filaments for fused filament fabrication of ceramics

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Fused filament fabrication (FFF) of ceramic components enables rapid prototyping of complex shaped ceramic components. Rheology of the feedstock material is crucial for the optimal performance during printing. However, due to the nature of the FFF which utilizes thermoplastic behavior in order to melt and extrude the feedstock which upon solidification retains its shape, not only the behaviour of molten feedstock, but also room temperature properties must be considered.

In order to investigate the effect of different rheological conditions on the printability of highly filled ceramic filaments, various amounts of paraffin wax (0, 20, 40 wt. %) were added to the ethylene vinyl acetate (EVA) based binder. Feedstock materials containing 50 vol. % of alumina powder were processed into continuous filaments and characterised in terms of filament flexibility (bending strain), buckling (compression modulus - viscosity ratio), printability (G'' , G') and interlayer welding (relaxation modulus $G(t)$). As expected the increase in paraffin wax concentration significantly affects the rheological properties of the thermoplastic feedstocks and printing behaviour of thermoplastic filaments.

Kindly invited.