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Example use of screening and analytical tools for secondary processing

1) Example screening tool for polymer processing by Hot-melt-extrusion – Fixing compressive load, constant deformation temperature sweep using a rotational rheometer.

Screening a viable processing space for polymer formulations in HME is a time and labour intensive process. Processing conditions such as operating temperature are often based on a glass transition (Tg) or time and labour intensive process. Processing conditions such as operating temperature are often based on a glass transition (Tg) or melting point suppression are in agreement with the printability of these formulations. Additionally as a result of high API loadings. Upon storage, this can often be seen as changes in visual appearance resulting from crystallisation of API. Additionally as a result of the print process the thermal history is altered versus post HME extrudate. The example above demonstrates the capability of differentiating between different formulations. In this case an HPMC-Paracetamol system is shown vs commercial filament. The flexural properties of the 5-50% API loaded filaments were in agreement with the printability of these formulations. Additionally thermal analysis of these formulations aligned with the broad groupings observed from this mechanical testing. This may be indicative of the distribution of components and subsequent micro-structure within the filaments. E.g glass transition temperatures and melting point suppression are in agreement with the flexural properties.

For further information please contact elke.prasad@strath.ac.uk