

## **Tailored structuring and biaxial deformation behaviour of Polyethylene terephthalate - clay nanocomposites**

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Polyethylene terephthalate (PET) and nanoclay were mixed and prepared by melt compounding in a mini-mixer. A statistically based design of experiments (DoE) approach was used to investigate the effect of screw speed, residence time, extrusion temperature and clay loading on the structural parameters and mechanical properties of the nanocomposites. Quantitative characterisation of clay dispersion was achieved by the combination of transmission electron microscopy and optical microscopy. DMTA, Tensile, Flexural and DSC tests were used to characterise the mechanical properties and crystallisation of the materials. Results show that clay loading has the most significant effect on the overall improvement of mechanical properties. Various combinations of processing factors have also been identified that involve the enhancement of properties. Most importantly, there is a good correlation between structural parameters and mechanical properties, hence tailored structuring of the PET nanocomposites can be achieved.