



REALISING NANO-SCALE STRUCTURED SURFACES IN MICROMOULDING

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Accurately replicating nano-scale surface structures is a key challenge for micromoulding processes aiming to produce devices for a range of markets, particularly healthcare where there is a strong demand for surface structures designed to exhibit a particular surface wetting or bio-active response. This paper presents the results of investigations of two techniques for surface structuring. The first uses a conventional micromoulding process and investigates the processing window for successful replication of nano-scale structures which have been machined using FIB techniques in amorphous metals. The second study has moulded materials against a very smooth (<5nm Ra) sapphire surface and investigated the resulting surface roughnesses due to crystallisation kinetics (semi-crystalline materials, block co-polymers) and phase separation (blends). For each of these approaches a design of experiments moulding trial has been performed using a micromoulding machine to evaluate the influence of the process dynamics on the resulting forms. Surface topology has been characterised using atomic force microscopy (AFM) and 3D scanning electron microscopy (SEM). Polymer morphology has been studied using AFM, DSC and polarised light microscopy.