

3D tissue culture substrates produced by microthermoforming of pre-processed polymer films

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We describe a new technology based on thermoforming as a microfabrication process. It significantly enhances the tailoring of polymers for three dimensional tissue engineering purposes since for the first time highly resolved surface and bulk modifications prior to a microstructuring process can be realised. In contrast to typical micro moulding techniques, the melting phase is avoided and thus allows the forming of pre-processed polymer films. The polymer is formed in a thermoelastic state without loss of material coherence. Therefore, previously generated modifications can be preserved. To prove the feasibility of our newly developed technique, so called SMART = **S**ubstrate **M**odification **A**nd **R**eplication by **T**hermoforming, polymer films treated by various polymer modification methods, like UV-based patterned films, and films modified by the bombardment with energetic heavy ions, were post-processed by microthermoforming. The preservation of locally applied specific surface and bulk features was demonstrated e.g. by the selective adhesion of cells to patterned microcavity walls.