

題名:Mechanical Properties of Polylactide Films and Composites.

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摘要:A bioabsorbable self-reinforced polylactide/biphasic calcium phosphate (BCP) composite is being developed for fracture fixation plates. One manufacturing route is to produce preimpregnated sheets by pulling polylactide (PLA) fibres through a suspension of BCP filler in a PLA solution and compression moulding the prepreg to the desired shape. To aid understanding of the process, interactions between the matrix and filler were investigated. Composite films containing 0-0.25 volume fraction filler, produced by solvent casting, were analysed using SEM, tensile testing and dynamic mechanical analysis (DMA). Homogeneous films could be made, although some particle agglomeration was seen at higher filler volume fractions. As the filler content increased, the failure strain decreased due to a reduction in the amount of ductile polymer present and the ultimate tensile strength (UTS) decreased because of agglomeration and void formation at higher filler content. The matrix glass transition temperature increased due to polymer chain adsorption and immobilization onto the BCP particles. Complex damping mechanisms, such as particle-particle agglomeration, may exist at the higher BCP volume fractions.