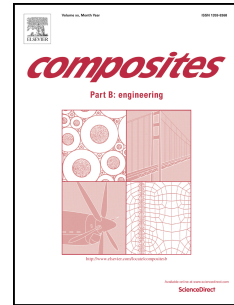


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Composites from poly(lactic acid) and bleached chemical fibres: thermal properties

Espinach, F.X.^{a*}, Boufi, S.^b, Delgado-Aguilar, M.^c, Julián, F.^a, Mutjé, P.^c, Méndez, J.A.^c

^a Design, Development and Product Innovation, Dept. of Organization, Business, University of Girona, Girona 17071, Spain

^b University of Sfax, Faculty of Science, LMES, BP 1171-3000 Sfax, Tunisie

^c Group LEPAMAP, Department of Chemical Engineering, University of Girona, C/M. Aurèlia Capmany, n°61, Girona 17003, Spain

***Corresponding author:** * Escola Politecnica Superior. Avda. Lluís Santalo, s/n, 17071 Girona, Spain. Francisco.espinach@udg.edu, tlf. +34 972 418 920, FAX +34 972 418 399

Abstract

Poly(lactic acid) (PLA) reinforced with bleached kraft soft wood (BKSW) biocomposites with fibre content up to 35% were processed by kinetic mixing and injection moulding. The cellulosic filler was a commercial chemical bleached kraft soft wood pulps composed of well individualized fibres free from lignin with diameter about 20 µm and length within micron scale. The effect of fibre addition on the thermal properties of composites was investigated using differential scanning calorimetry (DSC), dynamic mechanical analysis (DMA), thermal gravimetric analysis (TGA) and thermo-mechanical analysis (TMA). In a previous work, it was demonstrated that fibre inclusion on PLA enhanced the modulus as well as the strength. Fibre addition promoted the crystallization of PLA by favouring the heterogeneous nucleation and accelerating the crystallization kinetic, without adversely altering the thermal stability. The DMA analysis confirmed the strong stiffening effect brought by the addition of fibres at the glassy as well as the rubbery domains. The presence of fibres had also a beneficial effect on the dimension stability by lowering the thermal expansion coefficient of composites.

Keywords

Composite materials, cellulose fibres, thermal properties, poly(lactic acid).

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