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Positive effect of biaxial stretching on the mechanical behavior of PLA-Talc nanocomposites SAADIA OUCHIAR, GRÉGORY STOCLET, Université de Lille 1 - UMET, CYRILLE CABARET, Ecomeris, VINCENT GLOAGUEN, Université de Limoges - LCSN, JEAN-MARC LEFEBVRE, Université de Lille 1 - UMET, UMET - ENGINEERING POLYMER SCIENCE TEAM, UMET / ECOMERIS COLLABORATION, UMET / LCSN COLLABORATION
— Poly (Lactic acid) (PLA), a biodegradable polyester issued from renewable resources, appears as a good candidate for the replacement of petrochemical-based materials due to its good combination of physical properties. However main drawbacks of PLA are its brittle behavior and its low thermal stability. One way to outclass these lacks consists in adding nanofillers into PLA. It is also recognized that the mechanical and barrier properties can be improved by biaxial drawing process. Consequently, this study deals with the enhancing effect of biaxial stretching on mechanical properties of Talc based PLA nanocomposites. The Talc content was varied between 0 to 30 wt%. This high level of talc results in a decrease in material cost, in addition to the enhancement of various physical properties. A main result is that neat PLA, which initially exhibit a brittle behavior upon uniaxial stretching at room temperature, become ductile after being biaxially stretched under appropriate conditions. More surprising is that the same behavior is observed for the filled samples. The origin of these enhancing properties will be also discussed.

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