

عنوان مقاله:

Using spray dried nanofibrillated Cellulose as an alternative to upgrading its effect in PLA nanocomposite

محل انتشار:

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خلاصه مقاله:

This research used an oven and spray drying method to dry nanofibrillated cellulose (NFC) and evaluates its effect on polylactic acid (PLA) nanocomposite properties. As shown by atomic force microscopy (AFM), the average size of nanocellulose in the spray-dried sample (NCSD) was ۸۴-۹۶ nm. However, the average size of nanocellulose obtained from oven drying was ۶۴۷-۶۹۷ μm . The average size of the NCSD sample indicates that spray drying kept nanocellulose in the nano-scale range after drying. A melting process was then used to reinforce the polylactic acid matrix with the spray and oven-dried nanocellulose. Compared to neat PLA and PLA-containing oven-dried forms of nanocellulose (PLA-NCOD), our results showed a significant improvement in the mechanical strength of nanocomposites containing PLA-NCSD. PLA-NCSD nanocomposite demonstrated greater thermal stability than neat PLA and PLA-NCOD when subjected to thermal analysis. This study clearly illustrates the comparative effect of spray-dried nanocellulose on reinforced nanocellulose/PLA composites.

کلمات کلیدی:

Mechanical Properties, Nanocellulose drying, Nanofibrillated cellulose (NFC), Polylactic Acid, Thermal properties

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