ISFOR 2017 International Symposium on New Horizons in Forestry
18-20 October 2017 | Isparta - Turkey
Oral presentation

Effect of TiO_2 nano particles on mechanical and thermal properties of wood plastic nanocomposites

Alperen Kaymakçı[1,*], Emre Birinci[2], Türker Güleç[3], Nadir Ayrılmış[4]

[1] Kastamonu University, Faculty of Forestry, Deparment of Forest Industry Engineering, Kastamonu
[2] Kastamonu University, Arac Rafet Vergili Vocational High School, Department of Forestry, Kastamonu
[3] Artvin Coruh University, Faculty of Forestry, Deparment of Forest Industry Engineering, Artvin
[4] Istanbul University, Faculty of Forestry, Deparment of Forest Industry Engineering, Istanbul
[*] Corresponding author: akaymakci@kastamonu.edu.tr

Abstract: Effect of TiO_2 nano particles on mechanical and thermal properties of wood polymer nanocomposites was investigated. To meet this objective, pine wood flour, polypropylene with and without coupling agent (maleic anhydride grafted polypropylene), and TiO_2 were compounded in a twin screw co-rotating extruder. The mass ratio of the wood flour to polypropylene was 50/50 (w/w) in all compounds. Test specimens were produced using injection molding machine from the pellets. The mechanical properties, and thermal analysis (thermogravimetric analysis and differential scanning calorimetry) of the nanocomposites were investigated. The flexural and tensile properties of the wood polymer nanocomposites increased with increasing content of the TiO_2 and maleic anhydride grafted polypropylene (3 wt%). The mass loss rates of the wood polymer nanocomposites decreased with increasing amounts of the maleic anhydride grafted polypropylene and TiO_2. The differential scanning calorimetry analysis showed that the melt crystallization enthalpies of the wood polymer nanocomposites increased with increasing amount of the TiO_2. The increase in the Tc indicated that the TiO_2 were the efficient nucleating agent for the wood polymer nanocomposites.
Keywords: TiO_2, Nanocomposites, Wood, Plastic, Characterization