

SUSTAINABLE FILAMENT FOR 3D PRINTING BASED ON TiO₂/PLA NANOCOMPOSITE: DEVELOPMENT AND CHARACTERIZATION

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The present study analyzes the mechanical properties of TiO₂/PLA nanocomposites, in order to select the best option for filament for 3D Printing. A comparative study of nanocomposite properties has been carried out using two different TiO₂ nanoparticles concentration (0.5 and 1%). Furthermore, a surface modification (functionalize) in TiO₂ nanoparticles surface was performed. The morphology of the nanoparticles was characterized using a transmission electron microscopy (TEM). Dynamic mechanical analysis (DMA) of the PLA nanocomposites was performed, it was observed that all the nanocomposites showed good adhesion between the nanoparticles and the PLA matrix, except for the SF1 nanocomposite, which offered the lowest Young's modulus compared to the pure PLA filament, representing energy savings in processing. Contact angle values have been obtained for PLA nanocomposites, showing wetting changes from hydrophilic (60 to 85 degrees) to hydrophobic (100 degrees) in the SF0.5 sample.

Keywords: sustainable, 3D Printing, Nanocomposite

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