

Abstract

The aim of this investigation was to evaluate the effect of MAPP and Isocyanate coupling agents Nano silica and Nano clay particles on physical and mechanical properties of wood-plastic composites of wood flour and high density Polyethylene. For this purpose wood flour and PE with a weight ratio of 50 to 50, MAPP and Isocyanate at two levels of 0 and 3% Nano clay and Nano silica at 3 levels (0, 2, 4%) was mixed in the extruder at 70 rpm under 160 degrees Celsius. The test samples by using of injection molding method were made according to ASTM for mechanical testing (bending strength, flexural modulus, tensile strength, tensile modulus, Impact strength) and physical testing (water absorption and thickness swelling). Also to evaluate the significant difference between the treatments were used of factorial test in completely randomized design and for comparison between the means of Duncan test in level of 5% was used. The results showed that all the mechanical strength of wood-plastic composites increased by MAPP compatibilizer; while the physical properties of composites improved in the presence of isocyanate compatibilizer and mechanical properties improved by increasing the amount of nanosilica and nano-clay. Water absorption increased by the increase of nano-silica as well as Water absorption decreases with increasing nano-clay and then thickness swelling declined in both Nano. The composite structural studies with X-ray diffraction showed that nano clay was distributed as intercalation structure in polymer matrix and the distance between the layers improved by increasing clay nanoparticles. Also, in the high levels of silica nanoparticles, particle collection occurs and the crystal size increases.

Key words: Wood Polymer Composites, Isocyanate, maleic anhydride polypropylene, nano silica, nano clay.



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**Effect of isocyanate, maleic anhydride
polypropylene and amplifiers as nano
silica, nano-clay on the physical and
mechanical properties of wood plastic
composite**

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