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POLYMER NANOCOMPOSITES BASED ON BUTADIENE RUBBER/PCW/NANOCLAY

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Modification of Butadiene Rubber (BR) due to the low mechanical properties such as tensile modulus and tensile strength seems necessary. Addition of fillers to BR compounds is a good choice to solve the problem. In recent years, Polymer/clay nanocomposites (PCNs), emerged as a new class of material, have attracted negligible interest from academia and industry. Compared with their relative micro and macro scale counterparts and their pristine polymer matrices, PCNs exhibit significantly improved performances such as tensile strength, modulus, heat resistance, gas barrier, swelling resistance, etc [1-3]. In this study, advantages of waste microfillers and nanoparticles has been combined to reach good mechanical properties. Nanocomposites samples based on Butadiene Rubber/Powder Coating Waste(PCW)/ Cloisite 15A with different compositions as (100/0/0), (100/20/0), (100/20/3), (100/20/5), (100/20/7), (100/0/3), (100/0/5) and (100/0/7) were melt blended in a Haake internal mixer at 110°C for 6:30 minutes; then the curing agents and additives including dicumylperoxide (DCP), Carbon Black(CB) and oil were added to the compound on a tow-roll mill. The effect of PCW and nanoclay on the mechanical and rheological properties and XRD of the samples was investigated. Regarding to the low cost of the PCW powder and its good processability with BR, besides the considerable improvements observed in the composite properties compared to the pure butadiene rubber and BR/Cloisite 15A, high advantages of using PCW powder in rubber industry are evidenced. These improvements would be attributed to the good interactions established between the filler and elastomer matrix.