ISSN: 1391-8796
Proceedings of 8th Ruhuna International Science & Technology Conference
University of Ruhuna, Matara, Sri Lanka
February 17, 2021

Purification of carbon black generated from passenger car tyre pyrolysis for dry rubber industry

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Waste tyre pyrolysis process has attracted considerable interest as a sustainable solution to manage the accumulation of waste tyres on earth. The process produces three main fractions: gas, liquid and solid. The gas fraction consists of light weight hydrocarbons, liquid fraction contains diesel range hydrocarbons, and the solid fraction is rich in carbon black. Both gas and liquid fractions are useful in industry as fuels however, the solid fraction has not been used in Sri Lanka due to the presence of many organic/inorganic impurities. The current study outlines an efficient and economical route to purify the contaminated solid carbon black for the manufacture of value added products. The pyrolytic carbon black was first passed over a magnetic separator to remove metallic particles followed by size reduction using milling and or sieving. These particles were de-mineralized using dilute acids and/or bases at 60-80 °C for 1-5 h. The treated and non-treated samples were fully characterized by CHN analyses, XRD, FT-IT, TGA, SEM-EDX, and iodine adsorption experiments. It was found that the properties of the purified carbon black were comparable to the properties of commercial grade carbon black: N330. The purified carbon blacks were used as re-enforcing filler for the preparation of rubber carpets. Physio-mechanical properties of the carpets prepared using purified carbon black were in good agreement with the carpet prepared using commercial carbon black, N330, which confirmed the effectiveness and the worth of the purification protocol of the current study.

Key words: *Waste tire Pyrolysis, Pyrolytic tire char, Carbon black, Purification*

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