

Physicochemical properties of pyrolitic carbon black from waste tyres

Abstract

Waste tyres which are mainly generated from automotive industries have become a major environmental problem to the local authorities, the tyre industries and tyre dealer. When tyres are no longer usable due to worn-out, defect or service failure they are usually dumped in the landfill sites. Pyrolysis is a process of the thermal decomposition of waste tyres in the absence of air and the oxygen. Pyrolysis may be an environmentally friendly process to transform used tyres into gas, oil, steel and carbon black waste. The rate of recovery is 45 wt % for fuel, 30 wt % for carbon black and 10 wt % for steel wires for each end-of-life tyre. In this paper, the potential use of pyrolised carbon black generated from pyrolysis process of waste tyres is investigated. From the physical analysis of this carbon black waste, it was observed that there are various refractive particle sizes from the sieve test and different morphologies gathered from SEM analysis. Moreover, X-Ray Fluorescence (XRF) and TGA/DTG analysis on the carbon black waste showed high content of inorganic additives such as Silica (Si), Calcium (Ca) and Iron (Fe) which contaminate the sample. The carbon black waste started to decompose at a lower temperature of 480°C to 680°C compared to standard black at 500°C to 740°C. The test results gathered in this paper will act as a base-line towards alternative material or to replace the commercial carbon black available in the market.

Keywords; Carbon Black Waste, Standard Carbon Black, Waste Tyres