

1st Africa Energy Materials Conference, 28-31 March 2017, published in Materials Today: Proceedings (2018)

Mechanochemical approach in the synthesis of activated carbons from waste tyres and its hydrogen storage applications

Rambau KV; Musyoka NM; Manyala N; Ren J; Langmi HW

The increase in waste tyres has led scientist in the quest for finding various ways for minimizing problems associated with their disposal. The sought solutions are not only meant to be environmentally friendly but also be able to boost the economy. Pyrolysis of waste tyres is one of the preferred ways of recycling waste tyres since it gives valuable products such as pyrolysis oil, gas and solid char. Solid char has low surface area and contains inorganic traces that disadvantage it from competing with commercial carbon black. The aim of this study was to apply the mechanochemical approach, which is the compaction of the solid char with an activating agent before the activation process in order to increase reactive sites. The solid char was initially treated with water, HF and HNO₃ prior to the mechanochemical approach. The obtained materials were analysed using EDS, XRD and FTIR. The textural properties were also studied using N₂ sorption isotherms. The HNO₃washed and compactivated CB had the highest surface area of 955.20 m²/g and also the highest H₂ storage capacity of 1.4 wt.% at 1 bar.

O²