

Synthesis and structural properties of coconut husk as potential silica source

ABSTRACT

In this work, waste coconut husk was explored as potential raw material for silica production. Coconut husk was burned in controlled environment inside electrical furnace at 500, 600 and 700 °C. These ashes were treated by using two different chemical treatments to extract the highest percentage of silica. XRF analysis of coconut husk ash (CHA) revealed that the content of SiO₂ varies between 8 and 11% and increased up to 90% after chemical treatment. Based on the XRD spectrum, silica obtained was in crystalline form after acid treatment but was in amorphous form after the alkali treatment. The CHA morphology on FESEM images observed to be rod-like structure but changed to irregular shapes and started to agglomerate together after the chemical treatments. EDX results show good agreement with XRF data as the same elements detected during both analysis. Alternative source of high purity silica can be obtained from CHA and it has high potential in optoelectronic application.

Keyword: Coconut husk ash; Silica; XRD; XRF; FESEM; Agricultural waste