

Effect of acid leaching on different state of rice husk

Abstract

Rice husks (RH) are agricultural wastes available abundantly in rice producing country. A by-product obtained from combustion of rice husk is rice husk ash (RHA) which is rich in silica (SiO_2) contents. This paper focused on the effect of acid leaching treatment on rice husk to produce high-purity silica. There are 4 different states of conditions involved; raw rice husk (RRH), treated rice husk (TRH), rice husk ash (RHA), and treated rice husk ash (TRHA). Citric acid; $\text{C}_6\text{H}_8\text{O}_7$ was used as a leaching agent. TRH and TRHA was leached to see whether treated rice husk before combustion (TRH) or treated rice husk after combustion (TRHA) will produce more high-purity silica. Chemical composition analysis shows high amorphous silica content which is 98.47% with low metallic impurities at 1.0 M $\text{C}_6\text{H}_8\text{O}_7$, 70 °C for treated rice husk (TRH). X-ray diffraction (XRD) pattern shows the presence of amorphous silica in treated rice husk (TRH) and crystalline silica in treated rice husk ash (TRHA). Fragmentation of TRH into small pieces after acid leaching is seen where there is significant increase in the exposed surface areas. High-purity amorphous silica with more than 98% was prepared via citric acid leaching treatment and combustion process.

Keywords

Combustion; Leaching; Rice husk; Silica