

Synthesis of Silicon from Rice Husk via SHS Route

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Abstract

In this paper we propose an economical method for the synthesis of high purity porous silicon using rice husk as a cheap source to prepare silica. The process consists of washing in HCl, calcining the raw material to obtain high purity silica and mixing the products with magnesium powder before being consolidated to a disk-shape sample. Discs are then placed in a SHS setup working under argon atmosphere. Ignition was carried out by passing a short DC pulse through a filament located close to the sample surface which triggers the reduction reaction. To remove impurities, combustion products were leached by acidic solution. Phase characterization experiments reveal that selected acidic solution can remove unwanted phases from combustion products also leaching treatment can influence on microstructure of combustion products because combustion product Morphology consist of a silicon matrix with MgO grains. By performing leaching, MgO grains dissolve and a porous structure of silicon remains. The SEM and XRD results, reveal the formation of highly pure silicon with a porous structure suitable for Li-ion battery anode applications.

Keywords: Silicon, SHS, Rice Husk, Silica, lithium-ion batteries.

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