

Synthesis of Amorphous Nanosilica Anode Material from Philippine Waste Rice Hull for Lithium Battery Application

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Abstract : Rice hull or rice husk (RH) is an agricultural waste obtained from milling rice grains. Since RH has no commercial value and is difficult to use in agriculture, its volume is often reduced through open field burning which is an environmental hazard. In this study, amorphous nanosilica from Philippine waste RH was prepared via acid precipitation method. The synthesized samples were fully characterized for its microstructural properties. X-ray diffraction pattern reveals that the structure of the prepared sample is amorphous in nature while Fourier transform infrared spectrum showed the different vibration bands of the synthesized sample. Scanning electron microscopy (SEM) and particle size analysis (PSA) confirmed the presence of agglomerated silica particles. On the other hand, transmission electron microscopy (TEM) revealed an amorphous sample with grain sizes of about 5 to 20 nanometer range and has about 95 % purity according to EDS analyses. The elemental mapping also suggests that leaching of rice hull ash effectively removed the metallic impurity such as potassium element in the material. Hence, amorphous nanosilica was successfully prepared via a low-cost acid precipitation method from Philippine waste rice hull. In addition, initial electrode performance of the synthesized samples as an anode material in Lithium Battery have been investigated.

Keywords : agricultural waste, anode material, nanosilica, rice hull

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