KAPLAT Achievement Report

Synthesis and Characterization of Silicon Nonocomposite Embedded Polymer

Myo Min Soe [1], Tosaka Masatoshi[2], Yamago Shigeru [2]

[1] Department of Chemistry, University of Yangon, Myanmar
[2] Institute for Chemical Research, Kyoto University, Japan

Scope of Research

Rice husk ash (RHA) is an abundantly available and sustainable agriculture by-product from rice processing in the rice-producing nations. It has the highest extent of silica content among all plant residues. RHA is a potential source of reactive silica, which has an assortment of uses in materials science. The attributes of the debris are subject to (1) structure of the rice husks (2) consuming temperature, and (3) consuming time. Polyvinyl alcohol is essentially made from polyvinyl acetate through hydrolysis. PVA has been applied in the mechanical, commercial, therapeutic, and nourishment sectors and has been utilized to create many final results, for example, polishes, resins, surgical threads, and nourishment bundling materials that are frequently in contact with nourishment. In this research, SiO2 will be extracted from Bio-waste rice hulls as starting materials because our nation's economy is base on agriculture and there is a lot of agro-waste. My motivation to do this research is to utilize agro-waste as important materials and to apply in waste water treatment processes.

Characterization of Research

Amassed with atoms of nanoparticles are comprised of inorganic or natural materials, which have numerous novel properties contrasted with the mass materials. Nanocomposites are heterogeneous materials-therefore their properties are controlled by indistinguishable elements from customary composites, i.e., segment properties, creation, structure, and interfacial communications. Their structure is generally more muddled than that of microcomposites, and that is particularly substantial for polymer/layered silicate nanocomposites. The point for doing this research are (i)to learn more about Nanotechnology, (ii)to synthesis and characterization of silicon nanocomposite embedded polymer, (iii) to learn advanced analytical technologies and,(iv)to get experimental experiences for my future research work.

Sample was collected from Taungdwingyi township, Magway region. Raw rice husk was provided by rice mill manufacturing plant. Analytical reagent-grade hydrochloric acid (HCl), sodium hydroxide (NaOH) and, sulphuric acid (H2SO4) was bought from local synthetic store. Distilled water and different synthetic compounds were of unadulterated evaluation.

XRD pattern of SiO2 nanoparticles in figure 1 showed significant peak at 2θ ~21.94. This obtained result confirmed the SiO2 nanoparticles synthesized from rice husk ash treated with acid.

TEM image in figure 2 showed that the particle size of SiO2 nanopatricles from rice husk ash was in a range from 10 to 30 nm.

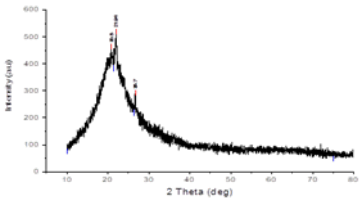

Fig.1.XRD pattern of SiO_2 nanoparticles

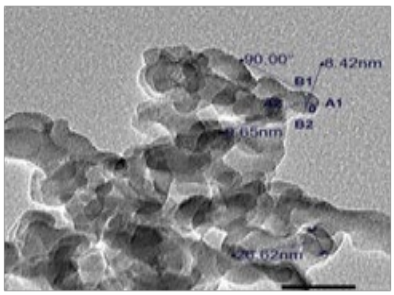

Fig.2. TEM image of SiO_2 nanoparticles

According to the research, by Sol-gel processing strategy, synthesis of SiO_2 NPs from RHA was completed. The average crystallite sizes of silica nanoparticles were determined and found to be 9.6nm by Scherrer's equation based on XRD data. According to the TEM result, the shape of silica is not spherical. The crystallite sizes of silica nanoparticles were determined and found to be ~8-27nm. This research will be economically benefits for farmer, industry sector and environmental. But, sample must try to confirm with other analytical technique such as FTIR, TG-DTA and it is need to find out the way to use nanosilica in another way. There is a problem to polymerize between SiO2 nanoparticles and PVA in this research. In the future research, it hopes to be solved.

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