왕겨를 통한 실리카 나노스페어의 제작과 특성

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Fabrication and property of silica nanospheres via rice-husk

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Abstract : Recently, silica nanostructures are widely used in various applicationary areas such as chemical sensors, biosensors, nano-fillers, markers, catalysts, and as a substrate for quantum dots etc, because of their excellent physical, chemical and optical properties. Additionally, these days, semiconductor silica and silicon with high purity is a key challenge because of their metallurgical grade silicon (MG-Si) exhibit purity of about 99% produced by an arc discharge method with high cast. Tremendous efforts are being paid towards this direction to reduce the cast of high purity silicon for generation of photovoltaic power as a solar cell. In this direction, which contains a small amount of impurities, which can be further purified by acid leaching process. In this regard, initially the low cast rice-husk was cultivated from local rice field and washed well with high purity distilled water and were treated with acid leaching process (1:10 HCl and H_2O) to remove the atmospheric dirt and impurity. The acid treated rice-husk was again washed with distilled water and dried in an oven at 60°C. The dried rice-husk was further annealed at different temperatures (620 and 900℃) for the formation of silica nanospheres. The confirmation of silica was observed by the X-ray diffraction pattern and X-ray photoelectron spectroscopy. The morphology of obtained nanostructures were analyzed via Field-emission scanning electron microscope(FE-SEM) and Transmission electron microscopy(TEM) and it reveals that the size of each nanosphares is about 50-60nm. Using the Inductively coupled plasma mass spectrometry(ICP-MS), Silica was analyzed for the amount of impurities.

Key words : Rice-husk(왕겨), Silica(이산화규소), Nanospheres(나노스페어).

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