

Fabrication and properties of silica and silicon nanospheres via rice-husk

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Rice crop is one of the major food crops in the world, which supplies the major wastes, in the form of rice-husk. Importantly, the rice-husk contains 75–85% organic and inorganic matter, which exhibit 94–96% silica along with other trace elements. The nanospheres of silica is widely used in various areas such as chemical sensors, biosensors, nano-fillers, markers, catalysts, and as a substrate for quantum dots because of the excellent physical, chemical and optical properties. In this connection, initially, the rice-husk was cultivated from local rice field and washed well with high purity distilled water and treated with acid leaching process (HCl Solution) to remove the atmospheric impurities and dried in an oven. The dried rice-husk was annealed at different temperatures for the formation of silica nanospheres. The confirmation of silica were observed via XRD, FE-SEM, TEM and it reveals that the size of each nanospheres is about 50–60nm. The amount of impurities was analyzed via ICP-MS. For silicon, the prepared amorphous silica was further reduced by metallic magnesium in a cylindrical furnace at 550~850°C. The X-rays diffraction (XRD) and IPC-MS revealed that the extracted silicon power exhibited very high purity of 99.9%.