RICE HUSK ASH A SUSTAINABLE SILICA SOURCE FOR SYNTHESIS OF HIERARCHICAL NANOSTRUCTURES

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Recently, extensive researches have been carried out on the use of alternative raw materials more economic and environmentally friendly. Agricultural wastes, like rice husk ash (RHA), have a great potential due to its availability and unique chemistry-related features. Its high silica content allows its use as a suitable source for silica-based nanostructured materials.

In the other hand, the synthesis of mesoporous silica with different morphologies and adjustable pore size has been studied worldwide for applications such as catalysis, separation, adsorption, and templates for new materials. The main interest in the development of these materials is to obtain a structure with a specific combination of pore sizes, hierarchical mesoporous silica provides this advantage.

In this work, hierarchical mesoporous silica was synthesized by a mixed surfactant system of F127-P123 copolymer triblocks, using tetraethyl orthosilicate (TEOS) and RHA as silica source. In a typical sol-gel synthesis route, organic-inorganic templates were prepared and later the resulting gel was aged under static conditions adding chemically treated and untreated RHA. Hierarchical mesoporous materials were obtained after the removal of templates by calcination. For structural, morphological and thermal characterization, Scanning Electron Microscopy (SEM), X-ray Diffraction (XRD), Fourier Transform Infrared (FTIR), Nitrogen isothermal adsorption and thermogravimetric analysis (TGA) were used. The particles obtained have different morphologies, high surface area, high thermal stability and hexagonal mesophases.

These characteristics make the rice husk ash an interesting source to design new nanostructured materials and open possibilities for new sustainable synthesis routes and applications.

Keywords: Rice husk ash, hierarchical mesoporous silica, sol-gel

References:


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