

Synthesis of nano-silica xero-gel from rice straw ash

This research aims to synthesize a silica xerogel from rice straw ash that is a residue biomass from agriculture. The first step of the synthesis is preparing of sodium silicate that is then used as silica source. To prepare a silica source, pretreated rice straw was burned at 600-900 °C to obtain a rice straw ash. Resulted rice straw ash is reacted with 0.5 M NaOH for 3-12 h and filtrated by a no.41 filter paper. The obtained sodium silicate is then mixed with 0.5 M HCl under stirring for 6 h to produce the nano-silica. In this study, nano-silica was synthesized by using a templating method, as well. Nano-silica synthesized with and without a template are characterized and compared. To increase the purity of nano-silica xerogels, as-synthesized silica was filtrated and clean with deionized water for 3 times, dried in electric oven at 85 °C overnight and calcined at 500 °C. Various analytical techniques like SEM, TEM, XRD, FTIR, BET and % whiteness, are employed to confirm the quality of particles. First experimental results showed that nano-silica with purity up to 99 wt% were completely synthesized. Nano-silica with intermediate specific surface area and pore volume was obtained.

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