SYNTHESIS OF CARBON-OPACIFIED-SILICA-AEROGEL USING BAMBOO LEAF

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Abstract: Opacification of silica aerogel to reduce its thermal conductivity had received much attention in recent years. In such context, aerogels are normally opacified with carbon black to mask out the radiative heat loss in the infrared region. The motivation of this work is to use bamboo leaf as a single source to synthesize water glass and activated carbon. Both of these precursors were then used to synthesize and opacify silica aerogel. Since bamboo leaf is an agriculture waste, this provides an alternative lost cost source to synthesize carbon-opacified-silica-aerogel.The properties of bamboo leaf aerogel that opacified activated carbon was compared then with other aerogels including those opacified with carbon black and also aerogel synthesized from TEOS alkoxide.Results show that aerogels opacified with activated carbon synthesized has bulk density of 0.069±0.0014 $g.cm^{-3}$, porosity of 97.9%, BET specific surface area of 330.5±3.7 $m^2.g^{-1}$, total pore volume of 1.38±0.07$cm^3.g^{-1}$ and thermal conductivity of 0.0311±0.009$W.m^{-1}.K^{-1}$. TGA of aerogels also show that opacified aerogel is thermally stable up to 495°C and therefore suitable to be used in thermal insulation at high temperature.