

## PREPARATION AND CHARACTERISATION OF CARBON-SILICA COMPOSITE AEROGELS DERIVED FROM KAPOK FIBRES/TEOS

PANIDA Punsombut, PUTKHAM Apipong, IMKUM Ajchara

*Maharakham University, Faculty of Environment and Resource Studies, Maharakham, Thailand*

### **Abstract**

Porous carbon-silica (C-S) composite aerogels have attracted considerable attention due to their potential applications, such as adsorbents, catalysts, and dual-phase fillers. In particular sol-gel method, resorcinol-formaldehyde (RF) and tetraethyl orthosilicate (TEOS) are used as the carbon and silica precursors, respectively. However, RF can potentially cause dermatitis in allergic persons and may release formaldehyde emissions during the sol-gel process. This work proposes low cost and environmentally-friendly composite aerogels by using low density kapok fibres with high carbon content as a replacement of RF-carbon precursor. Volume of kapok fibres was varied from 5 to 20%. Kapok fibres were loaded to TEOS sol followed by gel incubation, solvent exchange and gel drying at atmospheric pressure. The dried fibre-silica composite aerogels were then pyrolysed under N<sub>2</sub>-rich atmosphere at 400 °C to produce C-S composite aerogels. Pore morphology and surface chemistry of C-S composite aerogels were investigated. The results indicate that both the surface area and the pore volume of C-S composite aerogels decreased with increasing fibre loading. The C-S composite aerogels obtained from mixtures containing 5% of kapok fibres have a high BET surface area of 753 m<sup>2</sup>/g with a mean pore size of 5.5 nm.

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