

## **Sol-gel synthesis of novel silica hybrid xerogels: Porous studies**

### **Abstract**

Hybrid silica xerogel mesoporous composite was synthesized by a low temperature acid catalysed sol-gel route where a natural copolymer; sodium alginate (Na-COOH) together with calcium oxide (CaO) powder were incorporated into silica sol precursor prior to gel formation. For this study, bulk xerogels samples were prepared with the amount of silica precursor and the natural copolymer was fixed meanwhile the loading of calcium oxide was varied at 10 and 20 wt%. The porous properties were studied and the comparison between the hybrid silica and monolith was made. The calcium oxide powder used in this study was prepared from calcium hydroxide, CaOH compound, which been calcined at 1000°C for 3 hours in normal air. Mesoporous structure with small particle size and glassy phase of matrixes are the main features of the prepared xerogels. The presence of sodium alginate and calcium oxide in silica matrixes produces a significant decrease especially in total surface area and porosity volume of the xerogel samples. Monolith silica xerogels exhibits a very large surface area approximately at 600 m<sup>2</sup>/g compared to the hybrid xerogels which showed 120m<sup>2</sup>/g and 25m<sup>2</sup>/g for the respective 10 and 20 wt.% of calcium oxide loading. Nevertheless, only a slight increased in pore size has been observed due to the increased amount of calcium oxide loading.

**Keywords;** Composite, Hybrid Material, Mesoporous, Silica Xerogels, Sol-Gel Synthesis