CHAPTER VIII
CONCLUSIONS AND RECOMMENDATIONS

Polybenzoxazine organic aerogels and their related carbon aerogels have been successfully prepared by sol–gel process using xylene as a solvent. With this new approach of carbon aerogel fabrication, the total processing period was shortened from normally 2 weeks for traditional phenolic precursors to only 1 week for polybenzoxazine. When considering the micropore and the mesopore portions of the resulting areogels, these carbon aerogel structures had a higher proportion of micropore to mesopores, as compared with carbon aerogels derived from other precursors or processes. The improvement in thermal stability of the resulting polybenzoxazine aerogel was observed, comparing with that of the corresponding bulk polybenzoxazine. Moreover, this work also introduced a noncomplex and economical foaming method of polybenzoxazine foams and their correlative carbon foams. The foam density strongly affected the mechanical properties and deformation behaviors of the resulting polybenzoxazine foams. By adding glass reinforcing fiber into the foams, mechanical and thermomechanical properties of the resulting foams were significantly developed with limited fiber content. Furthermore, the result in this study revealed that after carbonization of the polybenzoxazine foam, partially crystalline carbon foam with greater compressive properties was attained.

The recommendations for the related future works are;

(i) investigating different systems of the aerogel synthesis by varying the types of incorporating precursors (e.g. phenolic compound, primary amine, solvent)

(ii) (ii) clarifying the gellation mechanism of benzoxazine in the solvent during the sol-gel process.