

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

Poly(DVB)HIPE porous foam was prepared successfully by varying the composition of three surfactants —SPAN80, DDBSS, and CTAB— in a series of five mixed ratios —4.3:0.4:0.3, 6.3:0.4:0.3, 7.8:0.4:0.3, 9.3:0.4:0.3, and 11.3:0.4:0.3, respectively— using acid-treated organo-modified bentonite (0 and 10 %wt) as inorganic reinforcement. The obtained polyHIPE were characterized for phase morphology, surface area, thermal properties and mechanical properties. Both decomposition temperature (+10 °C) and compressive modulus (+10%) of the resulting materials were improved when 10 wt% acid-treated clay was employed. Highest surface area of both SDCC0 and SDCC10 was achieved when materials were further subjected to use optimum amount of nonionic surfactant. The suitable amount of % total surfactant for CO<sub>2</sub> gas retention was 7% for pure polyHIPE and 10% for polyHIPE filled with acid-treated organo-modified clay, respectively. With this two % total surfactants, surface areas of 541 m<sup>2</sup>/g (for the pure PolyHIPE) and 638 m<sup>2</sup>/g (for the filled PolyHIPE) were obtained, along with CO<sub>2</sub> retentions of 13.98 mmol/g and 13.89 mmol/g, respectively.

A new method of polyHIPE preparations were challenged to enhance the CO<sub>2</sub> gas adsorption capacity by changing monomer and changing inorganic filler. To accomplish the goal, polyHIPE should adsorb other toxic gases such as SO<sub>2</sub>, CH<sub>4</sub>, and H<sub>2</sub> beside only CO<sub>2</sub>.