CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

In this work, the organic-inorganic green porous hybrid composites from non-toxic raw materials by usingpolyvinyl alcohol (PVA) and calcium carbonate ($CaCO_3$) were prepared via a freeze-drying method to induce a 3-D interconnected porous structure. The porous hybrid composite had high thermal stability than pristine PVA. Morphological structure was changed by increasing of PVA concentration from 3%, 5% to 7% in water, leading to lower shrinkage and macropore size but enlargement of pore wall thickness. Moreover, the weight ratio between PVA and $CaCO_3$had an effect on the microstructure led to high porosity. The gas permeation of CH_4 is more than CO_2 depending on the size of gas by a small size of CO_2 molecules took long time in the complex pathway and due to the interaction between polar group of PVA and CO_2. The 7% of PVA in water with ratio of 1:1 showed the maximum CH_4/CO_2 selectivity when compared to increasing of both PVA and $CaCO_3$ content.

By considering the effects of composition on composite material, the future work should focus on how to design high separation-performance which was suggested to improve by using another method to control the pore of materials.