CHAPTER I
INTRODUCTION

One of the important of life, which causing a problem the most significances is air pollution which comes from many difference sources. The presence its harmful substances in the atmosphere i.e. nitrogen oxide, particular matter, sulphur dioxide(SO_2), hydrocarbon, carbon monoxide (CO), and carbon dioxide(CO_2), ozone, etc. The industrial activities is mainly environment changes. These substances are toxic to the body and bad effect to our health. Carbon dioxide is considered to be one the major greenhouse gases directly influencing global climate change which contributing in atmosphere is presented on the greenhouse effect. It is estimated that 36% of the United States' CO_2 is produced from coal/fired power plants. Therefore there are developed adsorbent materials for capture and sequestration of carbon management in the environment. Modification measured at room temperature 25°C and 1MPa (Volzone C. *et al.*,2007).

High internal phase emulsions is a template for preparation of highly porous materials, called polyHIPEs obtained from high internal phase emulsions. An emulsion is described to form oil-in-water (O/W) or water-in-oil (W/O). HIPEs containing an organic continuous (external phase) and an aqueous (internal phase). The volume fraction of the internal phase exceeds 74.05%. The advantages of polyHIPE include highly interconnected open-cell structure, high surface areas, low density down, voids form 10 to 100 μm. and the ability to absorb large volume of liquid (Michael S. *et al.*,2008). One of the most widely used application of polymeric membranes, ion exchange, release system, adsorbents, catalyst support, tissue engineering and scaffold (Lee *et al.*,2004). The most HIPE are generally produced with more hydrophobicity.

The layer-by-layer (LbL) discussed theory and mechanism of charge transfer in polyelectrolyte multilayer films (PEM). Ability of LbL is generating unique material system advantages designing material systems that regulated transport ionic, electronic, and molecular species across a polyelectrolyte multilayer membrane. Examples it can exhibit gas transport, using a charged nanomaterial that fully dispersed in water typically dispersion from organic solvent but materials highly surface area

(Hammond *et al.*,2011). The layer by layer self-assembly (LbL) controlled thickness and molecular architecture. LbL is low cost process, very stable, environment-friendly. The common LbL method is based on alternating of ionic charges. A result of alternating to immerse of substrate (hydrophobic or hydrophilic) in a cationic and anionic polyelectrolyte solution (Iost *et al.*,2012). A method is modified surface of hydrophobic polyHIPE to enhancing hydrophilicity.

HIPE can adsorbed must be modified by the layer-by-layer that increasing functional group on surface. In adsorption process, molecules of CO_2 are adsorbed onto a surface of HIPE. On the surface must be have a functional group can be capture or adsorption such as amine functional group.

In this work high internal phase emulsion (HIPEs) modificated surface that used layer by layer to increase functional group. Enhancement CO_2 gas adsorption showed high surface area moreover adding amine group on surface.