CHAPTER I
INTRODUCTION

Mercury and mercury compounds are common components found in petroleum resources. The amounts and relative distribution of the mercury compounds in gas and liquid hydrocarbons depend on geologic location and varies between approximately 0.01 ppb and 10 ppm (wt). The detection and quantification of dialkylmercury in liquid hydrocarbons have been accomplished analytically and this compound partition to hydrocarbon liquid in separations and to distillation fraction according to their boiling points (Wilhelm *et al.*, 2000).

In Thailand, mercury has been found and reported by UNOCAL (Thailand) with the range of mercury concentrations in the natural gas and condensate of 10-25 $\mu g/m^3$ and 500-800 $\mu g/l$, respectively (Chongprasith *et al.*, 2001).

The mercury and mercury compounds in oil and gas have direct negative impact on petroleum processes especially on aluminum process equipment. They react and form an amalgam which can lead to failure. The reported corrosion of upstream heat exchangers at the Skikda LNG plant in Algeria was probably due to this effect. Corrosion of steel, chromium, brass and other copper and/or zinc alloys is also possible (Edmonds *et al.*, 1996).

Mercury can also cause server health problem by causing renal and nerve-tissue damage. Many gas plant operators are aware of the risk to health during plant maintenance. In order to eliminate the effect on people, equipment and catalytic mercury removal systems are significantly employed. The principle method to prevent mercury contamination at processing facilities is to remove mercury from the various feeds to the plant. Several commercial processes are available for this purpose. Mercury removal adsorbent beds or treaters are employed in which the removal material is specially designed for the particular application. Sorbents in the mercury adsorbent beds consist of an inert substrate (support) onto which is chemically or physically bonded a reactive compound reacts to form stable mercury compounds that retained by the sorbent bed.

Unfortunately, removal systems for mercury are ill suited to treating unconditioned hydrocarbons due to the fact that raw produced hydrocarbons contain numerous contaminations that interfere with the successful operation of the mercury removal systems (Wilhelm, 2001).

The main objective of this work is to stúdy the adsorption of large pore molecular sieve adsorbents in order to understand the adsorption mechanism such as pore size effect, kinetic, and isotherm of adsorption. In this research is using the oganomercury (diphenylmercury) as mercury contaminant and n-heptane as a liquid hydrocarbon. The diphenylmercury was prepared into two ranges of contamination, low mercury contamination at 2.0 mg and 5 mg for high mercury contamination per a liter of liquid hydrocarbon.