



## CHAPTER I INTRODUCTION

Wastewater from petroleum and petrochemical industry usually contains a substantial amount of organic compounds which are currently subjected to very strict environmental regulations due to their high toxicity to animals and human being. Therefore, effective measures to remove these harmful substances from industrial wastewater are ultimately indispensable, not only in terms of complying with governmental restrictions but also helping to reduce the negative effects to the environment caused by industrial activities. Moreover, another advantage in the removal of toxic compounds is to gain back the valuable substances that are released with the disposal.

Among many toxic organic compounds found in industrial wastewater, aromatic hydrocarbons (AHs) and polyaromatic hydrocarbons (PAHs) are those of greatest resistance to normal treatment wherein their polyaromatic ring-containing structure results in very complex degradation mechanism. The examples of aromatic hydrocarbons (AHs) are benzene, toluene, xylenes, phenol, and so forth. Naphthalene, 2-naphthol, phenanthrene, anthracene, pyrene, and so forth are examples of polyaromatic hydrocarbons (PAHs). Many techniques, such as adsorption, solubilization, adsolubilization, and so forth, are applied in order to remove those toxic organic compounds. Consequently, this work was employ the adsolubilization process, where water-insoluble organic compounds (solutes) adsorb onto the adsorbed layer which sometimes takes place even if the solutes themselves hardly adsorb at the interface (solid-liquid), in separating these toxicants from disposal stream and evaluated its practical application.

The purpose of this work was to investigate the adsolubilization of various EO/PO-type block copolymers in order to remove three toxic organic compounds; phenol, 2-naphthol, and naphthalene. These chemicals are composed of both aromatic hydrocarbons (AHs) and polyaromatic hydrocarbons (PAHs). Furthermore, EO/PO (ethylene oxide/propylene oxide)-based block copolymers, which are nonionic types of surfactant, were used because of their good detergency and property of non-toxic.

This study was aimed to investigate the adsorption of EO/PO-based block copolymer surfactants with different HLB values and configurations onto silica particles and also study the adsolubilization of various organic compounds by the silica-modified with various block copolymers. The scope covered the influence of HLB values and the configurations of the surfactants on the adsorption onto silica particles, the adsolubilization behaviors of modified silica from objectives for various aromatic compounds with different polarity and number of rings, and the comparison between silica adsorbent modified with different block copolymers on the adsolubilization of organic contaminants.