

CHAPTER I

INTRODUCTION

Reformed naphtha, one of petroleum fractions from an oil refinery, is considered as one of the main sources of the aromatics. The aromatic hydrocarbons are made up of benzene, toluene, xylene isomers, and ethylbenzene and are very important as they are essential inputs to the petrochemical industry. Because of closed-boiling mixtures, the separation can not survive the process of distillation. To avoid the difficulty, a process of solvent extraction is used.

Through the years, several solvents have been used in the extraction. Among these are sulfolane, polyethylene glycol, furfural, dimethylsulfoxide, N-methyl pyrrolidone, mixed solvents, and others. Some commercial processes have utilized these solvents. Since 1952, the “Udex” process, developed by UOP and Dow Chemical Co., used a diethylenglycol (DEG) as a solvent. However, DEG has relatively low capacity and high extraction solvent ratio is needed in the process. Shell/UOP then decided to use sulfolane-based solvent, which replaced DEG as a more efficient solvent. Other solvents used in processes such as a process by Lurgi, called “Arosolvan” process, is based on N-methylpyrrolidone and “Tetra” process by Union Carbide that tetraethylene glycol was selected. Solvent combinations, as a new approach of the solvent extraction, perform practical evidences that the desired properties of the two, or more solvents are compromised. N-methyl pyrrolidone/polyethylene glycol and 1-cyclohexyl-2-pyrrolidone/ethylene carbonate mixed solvent are examples of these.

Even though aromatics are necessary as mentioned, they are considered as one of well-known carcinogenic substances. To assure that dangerous levels of the aromatics do not take impact to human and environment, Ministry of Commerce plans to restrict aromatics content in gasoline within 35% by volume and tend to be mitigated further, Meeting this challenge will require taking a new approach of extraction processes. A suitable solvent for aromatics extraction is required to comply with present and future regulations.

The research work focused on the study of influence of different solvents, different ratios of mixed solvents, different temperatures, and different solvent-to-feed ratios on the aromatics extraction.