UNIVERSITI TEKNOLOGI MARA

REMOVING BASE MIST FROM FLUE GAS EMISSION

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ABSTRACT

Air pollution is a mixture between substances from natural gas with man-made where almost all factories contribute to harmful gases as their waste in the production line. This problem does not only effect human but also to animal and plants. Most studies on treating air pollution are only focus on one compound in the pollution and usually on acid gases compound. However, there are some base compound exists in the atmosphere creating air pollution. In order to overcome this problem, this study has been conducted which aiming to study the removal of various base gas using sulfuric acid solution and to investigate the effect of concentration of sulfuric acid and contact time toward base gas. Gas absorption method was use to capture gas compound by using sulfuric acid as solvent. This research will focused in three types of base, which are ammonia, triethylamine, and diethyl ether. The base gases were passed through various concentration of sulfuric acid with different time contact. Ammonia was removed with 0.05M, 0.1M and 0.5M of sulfuric acid and time taken of 5, 10, 15 and 20 minutes. Triethylamine was removed with 0.01M, 0.05M, 0.1M and 0.5M of sulfuric acid together with time of 10, 15, 20 minutes. Lastly, diethyl ether was removed with time contact of 5, 10, 15 and 20 minutes with 0.01M, 0.05M, 0.1M and 0.5M of sulfuric acid. The data were analyse using Gas Chromatography. Based on the analysis, higher concentration of sulfuric acid with longer contact time shows the most removal of base emission for all type of base. The best concentration and time for removal were the lowest and the shortest. For ammonia, 0.5M of sulfuric acid at 5 minutes achieved 100% efficiency removal. 100% efficiency of removal triethylamine achieved 0.1M for 5 minutes. Lastly, the best condition for diethyl ether is 0.1M of sulfuric for 5 minutes of contact time.

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CHAPTER 1

INTRODUCTION

1.1 Research Background

Pollution in the environment comes in three different types which are water, air and soil. It has been centuries the environmental pollution existed but it became worse when industrial revolution starts in the 19th century (Rinkesh, 2009). Parallel with the industrial revolution, various types of elements has been release to the environment and the environment cannot destroy it naturally and cause harm and damage to itself. Since these type of element were not produced naturally by the environment, the decomposing process may take up to 100th of years such as radioactive pollutants. Basically, pollution happens when the nature cannot destroy element that has been released unnaturally.

Environmental pollution were generated from several of causes. Industries have been the causes since a very long time. As stated in the paragraph above, industrial revolution starts at 19th centuries because increasing in the use of fossil fuels while later in 20th centuries, coal has been used replacing human force since it make machine work faster and pollution contribution from industry have increasing until today. Transportation also plays a role in the environmental pollution. Transportation have become a very important machine since it helps men to travel. Although it helps humankind in their daily work, but it contribute pollution especially to the air. Since men starts using transportation to travel, pollution has continued increasing until now.

Air is very essential to all living things not just human and animal but also plant. All creature in earth either on land or in the water need fresh clean air to stay healthy,