

Thesis Title Desulfurization from Diesel Oil by Catalytic Oxidation and Solvent Extraction
Author Miss Sineenat Techawanto
Major Program Chemical Engineering
Academic Year 2004

Abstract

According to the standard set by Ministry of Commerce in 1998 concerning the sulfur content for diesel oil in high-speed motor vehicle must be lower than 0.05% by weight. This research was studied the desulfurization of diesel oil by catalytic oxidation and solvent extraction. Ozone was used as the oxidant for changing the sulfur component in diesel oil to high polar, including the use ferric oxide support on activated carbon as the catalyst, and extraction using methanol as the solvent.

This experiment used diesel oil from 2 companies (Thai Oil Public Company Limited and Bangchak Petroleum Public Company Limited). The oil from Thai Oil Public Company Limited contained a sulfur content of 0.511% while the oil from Bangchak Petroleum Public Company Limited contained a sulfur content of 0.050% by weight, respectively. After testing diesel oil from the 2 companies using this method in the semi-batch and continuous reactor, the results showed that the main factors effected the operation were the retention time of ozone and diesel oil. It was concluded that the retention time of ozone in the oxidation was approximately 3.877 s and operated for 3 hr in the semi-batch system could reduce the sulfur content in the diesel oil from the Thai Oil Public Company Limited to 0.275% and from the Bangchak Petroleum Public Company Limited to 0.020% by weight. Furthermore, the continuous system could give more capacity but the sulfur content was little higher than that of the semi-batch system.

However, the comparison effective of 2 solvents in the extraction process was studied by using furfural as the comparative solvent. This experiment found that both of 2 type raw material diesel oil extracted with methanol had more effectiveness than furfural.