

CHAPTER V

CONCLUSION

This study related to a process for improving the heavy distillate from Fang Refinery Plant to a suitable product that can be used as lubricating base oil. To achieve this objective, the study process was divided into three steps and was performed as follows.

The first step included dewaxing by MEK at 0 °C for improving the pour point of the heavy distillate. Dewaxed oil with pour point of 6 °C was obtained from this process.

This oil was further brought to a hydrodesulfurization reaction in the second step in order to reduce the sulfur content of that dewaxed oil. The reaction was performed in a batch reactor in the presence of hydrodesulfurization catalyst which contained 10% Mo, 5% Ni and 5% Co under hydrogen pressure of 600 psig. The reaction was operated at optimum condition that was 400 °C, catalyst concentration of 4% by weight of oil, and 6 hours, to obtain a desulfurized oil. The sulfur content of oil product was less than 0.001 % wt. The result from this reaction demonstrated that this prepared catalyst was extremely useful for the hydrodesulfurization process.

Finally, the desulfurized oil was subjected to hydroisomerization, in the third step hydroisomerizing that oil, using catalyst containing 0.3 % Pt and 0.5% fluoride on alumina support, to improve the physical and chemical properties of the desulfurized oil. This reaction was operated for 12 hours under hydrogen pressure of 600 psig, catalyst concentration 6 % by weight of oil and at 350 °C, to give the final oil product. The physical and chemical properties were characterized after lower boiling fraction was separated by distillation under reduced pressure and the final product had properties as

follow : pour point = 0 °C, VI = 78, sulfur content < 0.001 %, color = 0.5, oxidation point = 340 °C and oxidative compound = 9.47 %. The distillate cut having lower boiling point was obtained in about 18.51% yield from this study.

As mention above, this optimum conditions were useful for upgrading a dewaxed heavy distillate by increasing viscosity index and reducing both aromatic compounds and oxidative compounds. Moreover, the isomerized oil also had low sulfur content.

From this experiment it was suggested that hydrotreated oil could be used as lubricating base oil. However, this oil could be reupgraded until it was comparable to that of the commercially available lubricating oil by adding the suitable additives and the other properties improver.



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