CONCLUSIONS

7. CONCLUSIONS

The vacuum residues represent the large portion of crude petroleum distillates, although they are of relatively little commercial value. Therefore it is necessary to know more details about the structural characterization of these fractions before any improved process routes for upgrading them.

Two vacuum residues were delivered from two different petroleum refineries, one from Suez Petroleum Company, the second from Alexandria Petroleum Company. The two vacuum residues were analyzed in order to know how much they contain different constituents of aromatics, resins, asphaltenes and saturates. The data of analysis show the following:

1- The two vacuum residues contain higher amounts of aromatics over both saturates and resins. These data was given after solvent extraction using three different solvents having different carbon number, two are pure aliphatic, namely n-pentane and n-Hexane, while the third is ethyl acetate. Because n-heptane and ethyl acetate were more efficient in the process of solvent extraction, the n-pentane was only used in the case of Alexandria vacuum residue. Whatever the solvent used, the order of the percentage of the three components was: Aromatics > Resins > Saturates.

2- The vacuum residue from Suez company was found to have higher aromatic content than that present in the Alexandria vacuum residue, while Alexandria vacuum residue have higher percentage of both resins and saturates.

3- The data also show that the vacuum residue from Alexandria company have higher asphaltene content than that present in Suez vacuum residue.

4- The separated Maltenes were subjected to column chromatography in order to separate the saturates (n-paraffins plus cyclo-paraffins) and aromatics (mono-, di-, and poly-aromatics).

5- The separated saturates were then subjected to gas liquid chromatographic analysis to show how mush n-paraffins and cycloparaffins are contained in the saturate fraction separated from the Maltenes of each vacuum residue. The data of gas chromatography show that Maltenes separated from Suez and Alexandria residue using n-heptane have the greatest value of n-paraffins. The data of gas chromatography also show that, although ethyl acetate is less efficient as a solvent for n-paraffins, it is more efficient than n-pentane which was used only as a solvent for Alexandria vacuum residue.

6- The infrared absorption spectroscopy was used for the analysis of our studied residues and their solvent extracts. The data of the infrared studies showed that the two vacuum residues contain high amounts of aromatics. The mono aromatics represent the lowest constituent among the aromatics present, while the poly aromatic and di-aromatics are predominantly present and form the major constituent.

7- Our data on the two vacuum residues showed that Suez vacuum residue contains total aromatics higher than that contained in Alexandria vacuum residue, it is about 1.5 times in Suez residue than that in Alexandria residue. In the same time the di-aromatics and poly aromatics are approximately the same in both Suez and Alexandria vacuum residues, but the mono aromatics in the Suez vacuum residue is approximately double that present in Alexandria vacuum residue. On the other hand the di aromatics and poly aromatics in the Suez vacuum residue, each of them is approximately 1.5 times than that in Alexandria vacuum residue. The infrared of the separated saturates confirm the contamination of some traces of aromatics

8- The data of the ultraviolet studies of the separated aromatics and their constituents of mono-, di-, and poly-aromatics show that the alumina column chromatography, even it is a usual method for separating such components, but some of the di-aromatics and polyaromatics are usually contaminate the monoaromatics fraction.

9- The elemental distribution of sulfur, nitrogen, vanadium and nickel show that, as a whole, the weight percent of the nonmetals sulfur and nitrogen in Alexandria vacuum residue is higher than that in Suez vacuum residue. These percentage are 3.09 wt % sulfur and 0.65 wt % nitrogen in Alexandria vacuum residue, while the corresponding values in Suez vacuum residue are 2.89 wt % sulfur and 0.44 wt % nitrogen. On the other hand, the percentages of the metallic constituents of vanadium and nickel in the Suez vacuum residue are than those present in Alexandria vacuum residue. Always the vanadium content in the two residues is higher than nickel content. The nickel contents are 113.45 ppm and 89.94 ppm in Suez and Alexandria vacuum residues respectively, while the corresponding values of vanadium content in the two residues are 145.23 ppm in Suez residue and 118.23 ppm in Alexandria residue.

Finally, from our study, and from the data obtained, we can conclude that the two vacuum residues can be easily upgraded in order to obtain useful products. The vacuum residue from Suez, as it contains higher amounts of heavy metals, it affect the catalytic upgrading because the heavy metals chelates cause poisoning and fouling the catalyst and corrode the equipments and parts of the catalytic plants.

From our study, we can also conclude that ethyl acetate is highly efficient as a solvent extractor for the vacuum residues than both n-pentane and n-heptane. This is fully agreed with data given in the literatures.

It was stated and concluded that the product yield depends on the constituents of the feedstock. They found that most of the gasoline yield originate from the saturate constituent of the vacuum residue while the aromatic constituent contributes to gasoline and diesel yield. Therefore, we can conclude that the vacuum residue of Alexandria may be suitable for the production gasoline when upgraded while the residue of Suez is more suitable for the production of much quantities of diesel fuel over gasoline. This is because the vacuum residue from Suez contains higher amounts of aromatic that contained in Alexandria vacuum residue which contains approximately double saturate fraction as more as that in Suez.

REFERENCES

8. REFERENCES

1- Coleman, H.J.; Dooley, J.E.; Hirsch, D.E. and Thompson, C.J.; Anal. Chem., **45** (9), 1724, (1973).

2- Dooley, J.E.; Thompson, C.J.; Hirsch, D.E. and Ward, C.C.; Hydrocarbon Processing, **53** (4), 93, (1974).

3- Dooley, J.E.; Hirsch, D.E. and Thompson, C.J.; Hydrocarbon Processing, **53** (7), 141, (1974).

4- Dooley, J.E.; Hirsch, D.E.; Thompson, C.J. and Ward, C.C.; Hydrocarbon Processing, **53** (11), 187, (1974).

5- Hinds, G.P.; Jr. Proc. API Div. of Refining, **50**, 279, (1970).

6- Hinds, G.P.; Jr. Proc. API Div. of Refining, **49**, 147, (1969).

7- Ali, M. A. and Nofal, W.A.; Fuel Sci. and Tech. Intl., **12** (1), 21, (1974).

8- Ali, M.F.; Bukhari, A.; Hassan, M. and Salem, M.; Proceeding of the International Symposium on the Characterization of Heavy Crude Oils and Residues. Lyon, Editions Technip, Paris, 25–27 June, 373, (1984).

9- Sanchez, V.; Murgia, E. and Lubkowitz, J. A.; Fuel, **63**, 612, (1984).

10- McKay, J.F.; Amend, P.J.; hamsberger, P.M.; Cogswell, T.E. and Latham, D.R.; Fuel, **60**, 14, (1981).

11-McKay, J.F.; Hamberger, P.M.; Erickson, R.B.; Cogswell, T.E. and Latham, D.R.; Fuel, **60**, 17, (1981).

12- Hsu, C.S.; Liang, Z. and Campana, J. E.; Anal. Chem., **66** (6), 850, (1994).

13-Ohtsuka, T.; Catal. Rev. Sci. Eng., **16**, 291, (1977).

14-Beaton, W.I. and Pertolacini, R.J.; Catal. Rev. Sci. Eng., **33**, 281, (1991).

15- Koyama, H.; Nagai, E.; Torii, H. and Kumagai, H.; Stud. Surf. Sci. Catal., **100**, 147, (1996).

16- Santamaria-Ramìrez, R.; Marìnez-Escandell, M.; Torregrosa, P.; Marsh, H.; Rodrìguez-Reinoso, F.; Gómez-De-Salazar, C. and Romero-Palazón, E.; Carbon, **37**, 1567, (1999).

17-Heinz, E.A.; Carbon, **34**, 699, (1996).

18-Marsh, H.; Diez M.A.; Shibaev V.P. and Lam, L.; editors, Liquid Crystalline and Mesomorphic Polymers, New York: Springer-Verlag, Chapter 7, 231, (1994).

19- Marsh, H. and Latham, C.S.; The Chemistry of Mesophase Formation in: Bacha, J.D.; Newman, J.W. and White, J.L.; editors, Petroleum Derived Carbons, American Chemical Society, Washington DC, USA, 1, (1986).

20- Greinke, R.A. and Thrower P.A.; editor, Chemistry and Physics of Carbon, Marcel Dekker Inc., New York, **24**, 1, (1994).

21- Mochida, I.; Fujimoto, K.; Oyama, T. and Thrower P.A.; editor, Chemistry and Physics of Carbon, Marcel Dekker Inc., New York, **24**, 111, (1994).

22-Santamaria-Ramìrez, R.; Ph. D.Thesis. Spain: University of Alicante, (1992).

23- Santamaria-Ramìrez, R.; Romero-Palazón, E.; Salazar, C.G.; Rodrìguez-einoso, F.; Martìnez-Saez, S.; Martìnez-Scandell, M. and Marsh, H.; Carbon, **37**, 45, (1999).

24- Romero-Palazón, E.; Ph. D.Thesis. Spain: University of Alicante, (1992).

25-Rodrìguez-Reinoso, F.; Santana, P.; Romero-Palazón, E.; Diez, M.A. and Marsh, H.; Carbon, **36**, 105, (1998).

26- Boduszynski, M.M.; Rechsteiner, C.E.; Shafizadeh, A.S.G. and Carison, R.M.K.; Chevron Research and Technology Company, USA, {UNITAR Centre for Heavy Crude and Tar Sands, No. 1998, 202, (1998).

27-Jewell, D.M.; Weber, J.H.; Bunger, J.W.; Plancher, H. and Latham, D.R.; Anal. Chem., **44**, 1391, (1972).

28-Haines, W.E.; and Thompson, C.J.; ERDA Report. Of Inv., LERC/RI-75/5 and BERC/RI-75/2, 30, (1975).

29-McKay, J.F.; Cogswell, T.E.; Webber, J.H. and Latham, D.R.; Fuel, **54**, 50, (1975).

30-McKay, J.F.; Webber, J.H. and Latham, D.R.; Anal. Chem., 48, 891, (1976).

31-McKay, J.F.; John, F.; Latham R. and William E. Haines; Fuel, **60**, 27, (1981).

32-Helm, R.V. and Peterson, J. C.; Anal. Chem., **40**, 1100, (1968).

33-Ramsey, J.W.; McDonald, F.R. and Peterson, J.C.; Ind. Eng. Chem. Prod. Res. Develop., **6**, 231, (1967).

34-Dickson F.E.; David, B.E. and Wirkkala, R.A.; Anal. Chem., **41**, 1335, (1969).

35-Burton, D. and Beitchman, E.; J. Res. Nat. Bur. Stand., **63** A, 189, (1959).

36-Kleinschmidt, L. R.; J. Res. Nat. Bur. Stand., **54**, 163, (1965).

37-Corbett, L.W.; Anal. Chem., **41**, 576, (1969).

38-Jewell, D. M.; Albaugh, E.W.; Davis, B.E. and Roberto, R.G.; Ind. Eng. Chem. Fundam., **13** (3), 278, (1974).

39-Bunger, J.W.; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **19** (2), 231, (1974).

40-Eric Y. Sheu; Energy & Fuels, **16**, 74, (2002).

41-Speight, J.G.; Fuel Science and Technology Handbook, Marcel Dekker. Inc., New York, 143, (1990).

42-Bartholomew, C.H.; In Catalytic Hydroprocessing of Petroleum and distillates, Oballa, M.C.; Shih, S.S.; Marcel Dekker Inc., New York, 1, (1994).

43-Miyauchi, Y.; de Wind, M.; Proc. Akzo Nobel Catalysts Symposium, Hydroprocessing, 123, (1994).

44-Speight, J. G.; The Desulphurization of Heavy Oils and Residues, Marcel Dekker Inc., New York, 145, (1981).

45- Cimino, R.; Correr, S.; Del Bianco, A. and Lockhart, T. P.; in Asphaltenes Fundamentals and Applications, Sheu, E.Y.; Mullins, O. C.; Eds., Plenum Press New York, 97, (1995) .

46-Speight, J.G.; in Asphaltenes and asphalts, Yen, T.F.; Chilingarian, G.V.; Eds., Elsevier, Amsterdam, 7, (1994).

47-Bestougeff, M. A.; Byramjee, R. J.; Eds., Elsevier, Amsterdam, 67, (1994).

48- Dickie, J.P.; Yen, T.F.; Anal. Chem., **39**, 1847, (1967).

49-Yen, T.F.; Wu, W.H. and Chilingar, G.V.; Energy Resources, 7 (3), 203, (1984).

50- Yen, T. F.; Wu, W. H.; Chilingar, G. V.; Energy Resources, 7 (3), 275, (1984).

51-Speight, J.G.; Fuel, **49**, 76, (1970).

52-Jacobs, F.S.; Filby, R.H.; Fuel, **62**, 1186, (1983).

53-Speight, J.G; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **31** (4), 818, (1986).

54-Dickinson, E. M.; Fuel, **59**, 290, (1980).

55-Dereppe, J. M.; Moreaux, C. and Castex, H., Fuel, **57**, 435, (1978).

56-Dereppe, J. M., Moreaux, C., Fuel, **64**, 1174, (1985).

57-Calemma, V.; Iwanski, P.; Nali, M.; Scotti, R. and Montanari, L.; Energy Fuels, **9**, 225, (1985).

58-Snape, C.E. and March, M.K.; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **30** (2), 247, (1985).

59-Lynch, A.W. and Thomas, M.G.; "Asphaltene Analysis Using Size Exclusion Chromatography" Fuel Processing Technology, 13, (1983).

60-Oelert, H.H; Latham, D.R. and Haines, W.E.; "Characterization of Crude Oils By Gel Permeation Chromatography" Gel Permeation Chromatography, 547, (1971).

61-Phillip, C.V.; and Anthony, R.G.; "Analysis of Petroleum Crude and Distillates by Gel Permeation Chromatography" Size Exclusion Chromatography, 257, (1983).

62-Hirsch, E.; Altgelt, K. H.; Anal. Chem., **42**, 1330, (1970).

63-Haley, G.A.; Anal. Chem., **44**, 580, (1972).

64-Haley, G.A.; Anal. Chem., **43**, 371, (1971).

65-Malhotra, H.H.; Blanchard, S.L.; Anal. Chem., **50**, 1212, (1978).

66-Speight, J.G.; The Chemistry and Technology of petroleum, 3rd ed., Marcel Decker Inc., New York, (1998).

67- Speight, J.G. and Long, R.B.; Trowbridge, T.D., Fuel, **63**, 616, (1984).

68- Andersen, S.I.; Fuel Sci. Technology Int., **12** (1), 51, (1994).

69- Alboudwarej, H.; Beck, J.; Svrcek, W.Y. and Yarranton, H.W.; Energy & Fuel, **16**, 461, (2002).

70-Jacobs, F.S.; PhD Thesis, Washington State Univ., Pullman, (1982).

71- Jacobs, F.S. and Filby, R.H.; Anal. Chem., **55**, 1, (1983).

72-Long, R.B.; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **24**, 891, (1979).

73-Speight, J.G. and Long, R.B.; in "Atomic and Nuclear Methods in Fossil Energy Research" (Ed. R. H., Filby), plenum, New York, 295, (1982).

74-Speight, J.G. and Moschopedis, S.E.; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **24**, 910, (1979).

75-Hall, G. and Herron, S.C.; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **24**, 924, (1979).

76-Bunger, J.W.; Cogswell, D.E. and Zilm, K.W.; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **24**, 1017, (1979).

77-Yen, T.F.; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **24**, 901, (1979).

78-Witherspoon, P.Q. and Winniford, R.S.; in "Fundamental Aspects of Petroleum Geochemistry", (Eds. B. Nagy and U. Colombo) Elsevier, Amsterdam, Ch. 6, (1967).

79-Eldib, I.A.; Dunning, H.N. and Bolen, R.J.; Chem. Eng. Data, **5**, 550, (1960).

80- Weeks, R.W. and McBride, W.L.; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **24**, 990, (1979).

81-Bunger, J.W.; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **24**, 1028, (1979).

82-Mitchell, D.L. and Speight, J.G., Fuel, **52**, 149, (1973).

83-Altgelt, K.H.; in "Chromatography in Petroleum Analysis" (Eds. Altgelt, K.H. and Gouw, T.H.), Marcel Dekker Inc., New York, Ch. 13, (1979).

84- Altgelt, K.H.; Jewell, D.M.; Latham, D.R. and Selucky, M.L.; in "Chromatography in Petroleum Analysis" (Eds. Altgelt, K.H. and Gouw, T.H.), Marcel Dekker Inc., New York, Ch. 9, (1979).

85-McKay, J.F.; Amend, P.J.; Cogswell, T.E.; Harnsberger, P.M.; Erickson, R.B. and Latham, D.R.; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **22**, 708, (1977).

86-Dark, W.A.; J. Chromatography Sci., **16**, 289, (1978).

87-Speight, J.G.; Long, R.B. and Trowbridge, R.D.; Am. Chem. Soc. Div. Petrol. Chem. Preprints, **27**, 286, (1982).

88-Lazaro, M.J.; Domin M.; Herod A.A. and Kandiyoti R.; J. Chromatography A, **840**, 107, (1999).

89-Herod A.A. and Kandiyoti R.; J. Chromatography A, 708, 143, (1995).

90-Suelves, I., Fuel, **82**, 1, (2003).

91-Gustav, S.; Josef, B. and Nemer, M.F.; Journal of Chromatography A, **847**, 323, (1999).

92-Hirsch, D.E.; Hopkins, H. L.; Cotton, F.O. and Thompson, C.J.,J.; Anal. Chem., **44,** 915, (1972) & {ASTM Standard Test Method D-2549}.

93-Altgelt, K.H. and Boduszynski, M.M.; Composition and Analysis of Heavy Petroleum Fractions. Marcel Dekker Inc., New York, 291, (1994).

94-Yongzhi, Li; Xianliang Deng and Weile Yu; Fuel, **77**, 277, (1998).

95- Guanghua Yang and Ren An Wang, Journal of Petroleum Science and Technology, **22**, 47, (1999).

96- Watson, K.M. and Nelson, E.f., Improved Method for Fractions. Ind. Eng. Chem., **25**, 880, (1933).

97- Boduszynski M.M.; Energy and Fuels, **2**, 597, (1988).

98- Asaoka, S. and Nakata, S.; J. Jpn. Inst. Energy, **65**, 783, (1986).

99- Gallegos, E.J.; Green, J.W.; Linderman, L.P.; Letourneau, R.L. and Teeter, R.M.; Anal. Chem. **39**, (1967) 1833.

100- Lumpkin, H.E.; Anal. Chem., **36**, 2399, (1964).

101-Brown, R.A.; Anal. Chem., **23**, 430, (1951).

102-O'Neal; M.J., Jr. and Wier, T.P., Jr.; Anal. Chem., **23**, 480, (1951).

103-Aczel, T.; Rev. Anal. Chem., **1**, 226, (1972).

104-Keiko Miyabayashi, Yasuhide Naito, Kazuo Tsujimoto, Mikio Miyake; International Journal of Mass spectrometry, **22**, 93, (2002).

105-Hsu, C.S.; Liang, Z. and Campana, J.E.; Anal. Chem., **66**, 850, (1994).

106-Guan, S.; Marshal, A.G. and Scheppele, S.E.; Anal. Chem., **68**, 46, (1996).

107-Rodgers, R.P.; White, F.M.; Hendrickson, C.L. and Marshal, A.G.; Anal. Chem., **70**, 4743, (1998).

108-Ohashi, M.; Tsujimoto, K.; Funakura, S.; Harada, K. and Suzuki, M.; Spectrosc. Int. J., **2**, 260, (1983).

109-Miyabayashi, K.; Suzuki, K.; Teranishi, T.; Naito, Y.; Tsujimoto, K. and Miyake, M.; Chemistry. Letters, **29,** 172, (2000).

110-Miyabayashi, K.; Naito, Y.; Tsujimoto, K. and Miyake, M.; Eur. Mass Spectrom., **6**, 251, (2000).

111-Ancgeyta-Juárez; J. and López-Iounza, F.; Aguilar-Kodriguze, E., Ind. Eng: Chem. Res., **37**, 4637, (1988).

112-Ancgeyta-Juárez, J. and Murillo-Herández, J.A.; Energy Fuels, **14**, 373, (2000).

113-Kelly, J.J. and Callis, J.B., "Nondestructive Analytical Procedure for Simultaneous Estimation of the Major Classes of Hydrocarbon Constituents of Finished Gasoline". Anal. Chem., **62**, 144, (1990).

114-Fodor, G.E.; Mason, R.A. and Hutzler, S.A.; "Estimation of Middle Distillate Fuel by FT-IR". Applied Spectroscopy, **53**, 1282, (1999).

115-Andrade, J.M.; Muniategui, S. and Parada, D.; "Prediction of Clean Octane Numbers of Catalytic Reformed Naphthas using FT-MIR and PLS". Fuel, **76**, 1035, (1997).

116-Yuan Hongfu; Chu Xiaoli; Li Haoran and Xu Yupeng; "Determination of Multi-properties of Residual oils using Mid-Infrared Attenuated Total Reflection Spectroscopy, Fuel, **85**, 1720, (2006).

117-Chung, H. and Ku, M.; "Comparison of NIR, IR, and Raman Spectroscopy for the Analysis of Heavy Petroleum Products". Applied Spectroscopy, **54**, 239, (2000).

118-Wilt, B.K.; Welch, W.T. and Rankin, J.G.; "Determination of Asphaltenes in Petroleum Crude Oils by Fourier Transformer Infrared (FT-IR) Spectroscopy". Energy Fuels, **12**, 1008, (1998).

119-Aske, N.; Kallevik and H.; Sjoblom, J.; "Determination of Saturates, Aromatics, Resins and Asphaltenes (SARA) in Crude Oils by Means of Infrared and Near-Infrared Spectroscopy". Energy Fuels, **15**, 1304, (2001).

120-Chunming Xu; Jinsen Gao; Suoqi Zhao and Shixiong Lin, Fuel, **84**, 669, (2005).

121-Mohan S.; Rana and Vicente Sámano; Jorge Ancheyta, J.A.I. Diaz, Fuel, **86**, 1216, (2007).

122-Cuishi Guan; Zongxian Wang; Shanqing Yu; Aijum Guo and Guohe Que; Fuel Processing Technology, **85**, 165, (2003).

123-Parnariti, N. and Del Bianco, A.; Del Piero, G. and Marchionna, M., Applied Catalysis A: General, **204**, 203, (2000).

124-Parnariti, N.; Del Bianco, A.; Del Piero, G.; Marchionna, M. and Carniti, P.; Applied Catalysis A: General, **204**, 215, (2000).

125-Hidetsugu Fukuyama; Satoshi Terai; Masayuki Uchida; Jose L. Cano and Jorge Ancheyta, Catalysis Today, **98**, 207, (2004).

126-Rafael Menegassi de Almeida and Reginaldo Guirardello; Catalysis Today, **109**, 104, (2005).

127-Mohammed Farahat Ali and Saeed Abbas, Fuel Processing Technology, **87**, 573, (2006).

128-Speight, J.G.; Asphaltene and the Structure of Petroleum. Speight, J.G., editor. Petroleum Chemistry and Refining. Washington (DC): Taylor and Francis Pub., 103, (1998).

129-Speight, J.G.; the Chemistry and Technology of Petroleum, Marcel Dekker Inc., New York, (1999).

130-Ludwig, F.J.; Anal. Chem., **37**, 1737, (1965).

131-Tunescu, R.C. and Duinea, N.M.; Hydrocarbon processing, **54** (9), 160, (1975).

132-Whittle, P.J.; McCrum, W.A. and Horne, M.W.; Analyst, **105**, 679, (1980).

133-Daghbouche, Y.; Garrigues, S. and De La Guordia, M., Analyst, **121**, 1031, (1996).

134-Moschopedis, S.E. and Speight J.G.; Fuel, **55**, 187, (1976).

135- Landias, P.; Rochdi, A.; Largeau, C.; Derenne, S. Geochim.; Cosmochim, Acta, **57**, 2529, (1993).

136-Blanco, C. G.; Prado, J.G.; Diaz, C. Energy & Fuel, **10**, 77, (1996).

137-Yokota, T.; Scriven, F.; Montgomery, D.S.; Strausz, O.P; Fuel, **65**, 1142, (1986).

138- "Annual Book of ASTM Standards, Petroleum Products and Lubricants", vols. 05.01-05.03, Am. Soc. Test. Mat., Philadelphia, (2000).

139-"IP Standards for Analysis and Testing of Petroleum and Related Products", vols. 1 and 2, Inst. Pet., London, (1998).

140-"ASTM-IP Petroleum Measurement Tables", Metric Edn., Inst. Pet., London, (1973).

141-UOP "Laboratory Test Method for Petroleum and its Products", University Oil Products CO., Chicago, U.S.A., 1985.

142-Udoh, A.P.; Thomas, S.A.; Ekanem, E.J.; Bull. Chem. Soc. Ethiop., **4** (1), 13, (1990).

143-Altgelt, K.H.; Gauw, T.H. (Eds.), "Chromatography in Petroleum Analysis", Marcel Dekker Inc., New York, Ch. 6, (1979).

ARABIC SUMMARY

ARABIC SUMMARY

جامعة بنها - كلية العلوم
قسم الكيمياء

تقييم المخلفات البترولية كأساس لإنتاج مواد أخرى

رسالة مقدمة من

السيد خيرى عطية
بكالوريوس علوم - كيمياء

للحصول على درجة الماجستير فى العلوم - كيمياء

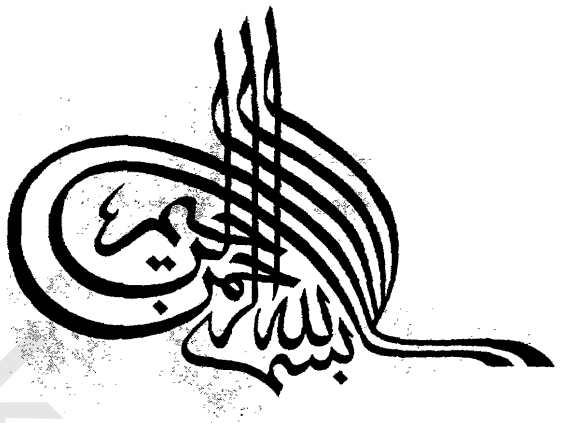
تحت إشراف

الأستاذ الدكتور / على أحمد محمد الباسوسى
أستاذ الكيمياء
قسم التحليل والتقييم
معهد بحوث البترول

الدكتور/ محمد حسين مصطفى أحمد
أستاذ الكيمياء العضوية المساعد
قسم الكيمياء - كلية العلوم
جامعة بنها

الدكتور / سمير محمد السيد
باحث
قسم التحليل والتقييم
معهد بحوث البترول

٢٠٠٧ م



(قَالُواْ سُبْحَانَكَ لاَ عِلْمَ لَنَآ إِلاّ مَا
عَلّمْتَنَآ إِنّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ)

صدق الله العظيم

[سورة: البقرة - الأية: ٣٢]

جامعـــــة بنهـــــا
كليـــــة العلـــــوم
قسم الكيمياء

تقييم المخلفات البترولية كأساس لإنتاج مواد أخرى

اسم الباحث: السيـد خيـــرى عطيـة

المشرفون:

الاســـــــــم	الوظيفـــــة	التوقيـــع
أ.د/ على أحمد محمد الباسوسى	أستاذ الكيمياء قسم التحليل والتقييم معهد بحوث البترول	
د./ محمد حسين مصطفى أحمد	أستاذ الكيمياء العضوية المساعد قسم الكيمياء - كلية العلوم جامعة بنها	
د./ سمير محمد السيد	باحث قسم التحليل والتقييم معهد بحوث البترول	

جامعـــــة بنهـــــا
كليـــــة العلـــــوم
قسم الكيمياء

تقييم المخلفات البترولية كأساس لإنتاج مواد أخرى

اسم الباحث: السيـــد خيـــــرى عطيـــة

لجنة الحكم والمناقشة

م	الاسم	التوقيـــــع
١-	أ.د/ محمد يوسف القاضى	
٢-	أ.د/ أحمد مؤمن المصرى	
٣-	أ.د/ على أحمد محمد الباسوسى	
٤-	د./ محمد حسين مصطفى أحمد	

تاريخ المناقشة: / /

الملخص العربى

تم استعراض مجموع ما كتب فيما يتعلق بموضوع الدراسه و قد تم في هذا الصدد التطرق إلى نبذه مختصره عن خواص الخامات البترولیه ومنتجاتها وبالأخص الخواص تلك المتعلقة بالقطفات الثقيلة والمتخلفة. كما تضمن ألاستعراض التطرق إلى الطرق ألمتبعه في التطوير والأستفاده من القطفات الثقيلة والمتخلفة وذلك بغرض تحويلها إلى مواد بترولية أكثر افاده.

في الجزء العملي تم دراسة التركيب الكيميائي لمركبين ثقيلين تم جلبهما من شركتي بترول مختلفتين ، هما شركة ألأسكندريه لتكرير البترول وشركة السويس لتصنيع البترول.

ولقد تم تعريض هاتين العينتين للدراسة المنشودة ، وذلك باستخدام الفصل بالطرق الطبيعية بطريقة المذيبات ألعضويه. ولقد تم انتقاء ثلاثة مذيبات هي : n-Pentane, n-Heptane and Ethyl acetate. والهدف من استخدام المذيبات ألعضويه هو فصل كل من "ألما لتينات Maltenes"و "ألأسفلتين Asphaltenes" و "الراتينجات Resins" من ألقطفه الثقيلة.

باستخدام "كروماتوجرافيا السائل Liquid Column Chromatography" تم تحليل "ألما لتينات Maltenes"وذلك بهدف فصل مكوناتها من "المواد ألمشبعه Saturates" و"المواد العطريةAromatics (Mono-, Di- and Poly-) " .

باستخدام طريقة التحليل بالأشعة فوق البنفسجية والمرئية " Ultraviolet – Visible"تم التعرف تفصيليا على عناصر "المواد العطرية (Mono-, Di- and Poly-) Aromatics" . أما ألأشعه "التحت الحمراء Infrared" فقد تم استخدامها للتعرف على المجموعات الوظيفية "Functional Groups" في كل من القطفات الثقيلة ومكوناتها من "ألما لتينات Maltenes"و "ألأسفلتين Asphaltenes" و "الراتينجات Resins".

باستخدام "كروماتوجرافيا الغاز Gas Liquid Chromatography" تم التعرف على مكونات المواد ألمشبعه "Saturates " من البارافينات المعتادة "n-Paraffins" البارافينات ألحلقيه "Cycloparaffins"