NEW RESULTS IN DEVELOPMENT OF DITHIOCARBAMATE TYPE EP/AWADDITIVES

J. Baladincz, I. Fekete, J. Petro, S. Szoboszlay and J. Toth

MOL Hungarian Oil and Gas Co. H-2443 Százhalombatta, P.O. Box 1, Hungary

As a good ashless anti-oxidant- and EP lubricant additive with no heavy metal content, we commercially manufacture the 4,4 E -methylene bis(dibutyl-dithiocarbamate), known as DITHIO-9. This is a new environmentally friendly technology, which yields a clearer, lighter product than the earlier procedures. The present paper gives an account on our latest achievements; we introduce two new memebers of the above-mentioned additive compound family. Exchanging n-butylamine with a composite amine, containig not only secondary but also tertiary amine groups, we obtained a new substance which surpasses the advantageous anti-oxidant and EP-additive effects of the DITHIO-9. We have named this compound as DITHIO-43. We have also prepared various derivatives of DITHIO-43. Reacted it with oleic acid we could increase its solubility in oils with not only preserving, but increasing the antioxidant efficiency. This substance has been named as DITHIO-4318.

Key words: dithiocarbamate

SYNTHESIS OF ISOBUTYRALDEHYDE FROM METHANOL AND N-PROPANOL OVER HYDROTALCITES AND HYDROTALCITE-LIKE COMPOUNDS

P. Dinka, K. Prandova and M. Hronec

Department of Organic Technology, Slovak University of Technology, Radlinskeho 9, 812 37 Bratislava, Slovak Republic

Vapour-phase synthesis of isobutyraldehyde from methanol and n-propanol (molar ratio 10:1) was carried out in fixed bed reactor over hydrotalcites and hydrotalcite-like compounds. Effect of V_2O_5 loading on activity and product distribution was observed. Catalyc activity of V_2O_5 loaded on another supports was compared. Effect of temperature space velocity, methanol: n-propanol ratio and addition of water to reaction mixture was also studied.

Key words: hydrotalcite, isobutyraldehyde, vapour-phase condensation

POLYMER APPLICATION IN CRUDE OIL TRANSPORTATION

S. V. Sinadinovic-Fiser, D. M. Stoiljkovic, M. R. Jankovic and R. Z . Radicevic

Faculty of Technology, University of Novi Sad, Bul. Cara Lazara 1, 21000 Novi Sad, Yugoslavia

In this paper, a few examples of polymer application in crude oil transportation are given, together with some of the theories which attempt to explain the phenomenon of drag reduction in the turbulent flow of a homogeneous polymer solution through pipes.

Key words: drug reduction, polymer-polymer interaction, polymer-solvent interaction

DEACTIVATION OF ZEOLITES OF ZSM-5 TYPE IN GAS CONDENSATE CONVERSION

A.V. Vosmerikov, Ya. E. Barbashin, L.M. Velichkina and L.L. Korobitsyna

Institute of Petroleum Chemistry, Russian Academy of Sciences, 634055, 3, Akademichesky Avenue, Tomsk, Russia

The process of coke formation on a zeolite catalyst has been studied in the conversion of a straight-run petrol of gas condensate. Initial zeolite has been shown to exhibit the highest activity, whereas a catalyst subjected to hydrothermal pretreatment exhibits the lowest activity, but is the most stable. The content of coke on the catalyst is somewhat smaller as compared with that on the initial sample, but a degree of polycondensation is substantially lower. Therefore it is easy to perform oxidative regeneration. It has been determined that cracking carried out in the presence of steam reduces condensity of coke deposits and decreases the amount of coke formed on the catalyst.

Key words: gas condensate conversion, zeolites

SEPARATION OF SULPHUR AROMATICS FROM PETROLEUM PRODUCTS

Z. Strnad and J. Cerny

Department of Petroleum Technology and Petrochemistry, Institute of Chemical Technology, Technicka 5, 166 28 Prague, Czech Republic

The method for separation of sulphur aromatics (PASHs) from polyaromatic hydrocarbons (PAHs) was based on a complexation chromatography with a silica gel with 5% of palladium chloride and a mixture of hexane and chloroform as a mobile phase. Efficiency of the separation was tested using standard compounds. The method was applied to aromatic fractions from middle vacuum petroleum distillate preseparated by adsorption chromatography. Good concentrates of PASHs were obtained for 2,3 and 4 ring PASHs.

Key words: sulphur aromatics

DETERMINATION OF ACYL CONVERSION IN VEGETABLE OIL ETHYL ESTERS

Z. Cvengrosová , J. Cvengros [a] and M. Hronec

Slovak University of Technology, Faculty of Chemical Technology Department of Organic Technology, [a] Department of Physical Chemistry, Radlinskeho 9, 812 37 Bratislava, Slovak Republic

A simple procedure for the evaluation of the process of conversion rapeseed oil to ethyl esters of fatty acids has been developed. These ethyl esters, prepared by transesterification of rapeseed oil with anhydrous ethanol, are used as alternative fuels for diesel engine. A method of gas-liquid chromatography (GLC) on packed columns was used to determine the conversion of acyls bound in acylglycerols to ethyl esters. This procedure is based on comparison of the peak areas of ethyl esters in fuel samples before and after reaction with an effective transesterification reagent, which will transform the unreacted acylglycerols to ethyl esters.

Key words: gas-liquid chromatography, ethyl esters, transesterification

INVESTIGATION OF THE BITUMEN/POLYETHYLENE BLENDS PROPERTIES

R. Z . Radicevic, D. M. Stoiljkovic and S. V. Sinadinovic-Fiser

Faculty of Technology, University of Novi Sad, Bul. Cara Lazara 1, 21000 Novi Sad, Yugoslavia

It is known that some of the properties of bitumen are improved by adding various polymers (the high-temperature stability and the low-temperature performances). Bitumen/polymer blends are used as the hydroinsulated sheets. The purpose of this work was to investigate the properties of bitumen /polyethylene blends. Low density polyethylene (LDPE) has been used as the modifier for bitumen. The type and the concentration of LDPE has been varied. The fracture point at low temperature, the softening point, the penetration properties and the oil leaching of blends have been determined. It was found that the properties of bitumen/LDPE blends have become better with the increase of LDPE concentration. It is desirable that LDPE is characterized by the low value of melt flow rate (MFR).

Key words: bitumen/polyethylene blends

EVALUATION OF THE COMPOSITION OF SBS RUBBERS BY NMR SPECTROMETRY

P. Daucik and N. Pronayova

Slovak University of Technology, Faculty of Chemical Technology Department of Petroleum Technology and Petrochemistry, Radlinskeho 9, 812 37 Bratislava, Slovak Republic

Abstract. For over 20 years, admixtures have been added to road bitumens to improve their performance. Styrene and butadiene block copolymers play an important role amongst these mixtures. Copolymers with flexible butadiene chains characterized by rigid polystyrene blocks at their ends - the so called styrene-butadiene-styrene copolymers (SBS) - proved to be the most suitbale bitumen modifiers. Knowledge of the SBS modifiers composition, confronted with the results of laboratory quality tests, permits to specify and facilitate the optimum preparation of modified bitumens. Nuclear magnetic resonance (NMR) was used to analyse the commercial samples of SBS in the presented work.

Key words: NMR, SBS copolymer

EFFECT OF PULSED ELECTROMAGNETIC FIELD ON CRUDE OIL DENSITY

S. R. Secerov, S. Sokolovic, N. Pekaric-Nad [a], and S. Sevic [b]

Faculty of Technology, University of Novi Sad, Cara Lazara 1, Yugoslavia [a] Faculty of Technical Science, University of Novi Sad, Fruskogorska 1 [b] Oil Company of Serbia, Maksima Gorkog 23, Novi Sad, Yugoslavia

The influence of low-frequency pulsed electromagnetic field (PEMF) on crude oil density was investigated on eight domestic crude oil samples of different pour points, ranging from ±308C to 38 8C. Homogenous single unipolar 70 ms wide quasi-square pulses, with peak intensity of 5 mT and frequency varying from 8

to 60 Hz, were generated by a generator with Helmholtz rings as antenna. Density measurements were taken on a digital densitometer Anton Paar, DMA 46. The crude oil samples were held in 100 ml beakers at controlled temperature and exposed to the PEMF only once for 60 minutes. Immediately after that density was measured at 20, 25 and 308C. The analysis of the results are based on the observed difference between the density in the presence and absence of PEMF,Dr and this quantity, depending on the sample, showed either an increaseDr40) or a decrease (Dr50). It was found that a maximal value of the absolute density change, |Dr|max is about 40 g/l. A linear temperature dependence was observed for all the samples on all applied frequency.

Keywords: pulsed electromagnetic field, crude oil density, temperature effect

STUDY OF RELATIONSHIP BETWEEN HPLC DATA AND SOME PARAMETERS USED FOR EVALUATION OF OIL QUALITY BY NEURAL NETWORK

S . Hatrik [a], J. Lehotay [b] and D. Oktavec [b]

[a] Department of Analytical Chemistry, Faculty of Pharmacy, Comenius University, 841 15 Bratislava, Slovak Republic [b] Department of Analytical Chemistry, Faculty of Chemical Technology, Slovak University of Technology 812 37 Bratislava, Slovak Republic

The back-propagation type of feed-forward layered artificial neural network was employed for prediction of some parameters used for the engine oil quality evaluation (kinematic viscosity, amount of insoluble compounds in heptane, Conradson's carbonized residue, alkalinity and carbonyl number). Prediction was based on the mathematical analysis of the quantitative data (selected peak's areas) obtained by reversed phase HPLC with diode array detection. Results shows a good agreement between calculated and experimentally measured data. Proposed method gives an alternative approach of engine oil evaluation.

Key Words: HPLC, oil, neural network

CARBON DIOXIDE AS A aGENTLEa OXIDISING AGENT

M. Kralik [a] and V. Macho [ab]

[a]

[a] Department of Organic Technology, Slovak University of Technology, SK-812 37 Bratislava, Slovak Republic; E-mail [b] Trencin University, Faculty of Industrial Technologies, T. Vansovej 1054/45, 020 32 Púchov, Slovak Republic

In spite of the lowest Gibbs energy of formation of CO_2 in the reaction mixture consisted of CO_2, CO, water and alkanes, thermodynamic calculations and experimental investigations proved a significant ability of CO_2 to oxidise alkanes. To exploit the oxidative ability of CO_2, catalysts based on transition metals, mainly from VIII, VII and VI groups need to be applied. Up to 50 % of methane may be converted aper passa over Ni based catalysts in the so called dry reforming, i.e., the reaction of CH_4 with CO_2 . The main differences in comparison to steam reforming (CH_4 and water) are in higher ratio of CO to H_2 in the output stream, higher extent of coking and necessity for supplying larger amount of heat. A similar statement is valid for the oxidative dehydrogenation of alkanes to alkenes. Yield more than 50 % of alkenes may be obtained aper passa over Cr-Mn based catalysts. Thus CO_2 may be used as an alternative source of oxygen, especially if higher proportion of CO in the output gas is desired and a high temperature (more than 700 8 C) supply of heat is available. In comparison with molecular oxygen, CO_2 is more agentlea oxidiser

due to the endothermic feature of the process. Processes with CO_2 possess higher yield of partial oxidised, or dehydroganeted organic products, which should make acceptable economy of these processes. Besides the utilisation of CO_2 as a reactant, its exploitation brings a little contribution to reducing of agreenhousea effect.

Key words: catalysis, transition metals, greenhouse effect, carbon dioxide, oxidation, dehydrogenation, alkenes, dry reforming