UNIVERSITY OF PANNONIA

SUBJECT DATASHEET

Semester:	2009/10/1
Subject:	Hydrocarbon processing III. (Lab)
Code:	VEMKOL4134B
Responsible department:	Department of Hydrocarbon and Coal Processing
Responsible department code:	MKOL
Responsible lecturer:	Dr. László Bartha

Educational objectives:

To get practice in using pilot plants of different hydrocarbon processes.

Detailed content of the subject:

Contents: The practical work is done in groups (2-3 persons) in 10 hours in a day by the processes as follows: Week 1. Formulation of modern motor oils by using base-oils and additives. 2. Production of motor gasoline components with high octane number by catalytic isomerization. 3. Production of malic acid by chemical synthesis. 4. Production of reduced sulphur containing diesel fuel by hydrodesulphurization. 5. Production of synthetic crude oil by cracking of waste plastics.

Requirements:

Types of Practical Exercises (Assignments) for Students: The personal work is done by the following examples: 1. Formulation of an engine oil. By using three basic oils with different viscosities, functional additives with blending charts the viscosity of a possible mixture of basic oils and the concentratios of the VI-improvers and the performance additives are determined. After the measuring the most important flow properties and oxidation and shear stability, the efficiency of the additives and the relationships between the composition and the engine oil characteristics are investigated. 2. Isomerisation of light hydrocarbons. Nafta (C5-C7 hydrocarbons) or individual hydrocarbons as n-hexane or n-pentane are convert to a mixture of isomer hydrocarbon mixture by a catalytic hydroisomerisation process in a pilot plant. The students investigate the relationships between the composition of the raw material, the process parameters and the composition of the end products. The properties of the reaction products as engine gasoline are investigated. 3. Production of malic acid. Malic acid is produced based on the reaction of maleicanhydride and water in a batch process. The process parameters are chosen by a simulation model. The relationships between the data predicted by the model and obtained by the experiment are to be compared and discussed. 4. Hydrotreating of gasoil fraction. By using a continuous process for a catalytic hydrotreating of a given gasoil fraction the efficiency of the hydrodesulphuration and saturation of aromatics are to be evaluated. The process parameters and the predicted properties of the gasoil are chosen by data of literature. The relationships between the reaction parameters and the main properties of the gasoil (sulphur and aromatic content, yield of liquids, cetane index) are to be investigated. 5. Polimer degradation. Synthetic crude oil is to be produced by using thermal or catalytic cracking process in a continuous tube reactor. The properties of the gas, liquid and solid products are measured. The relationships between the process parameters and yields of the cracking products and changes in their

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Requirements:

composition are to be studied. Examination Requirements and Questions: The rating of the personal performance is done by the next propartional marks by the weighting as follows: Practical work (by reports) 50 % Average mark 50 % of three marks ? summarized analysis of one of the processes (by presentation) ? answers for question in written form ? oval presentation The minimum percent for the pass level is 50 % from both the practical work and the other part of rating.

Required and suggested references:

Hancsók J..: Ásványolaj, szén- és petrolkémiai technológiai laboratóriumi gyakorlatok. Egyetemi jegyzet, Veszprém, 2006. Tanszéki munkaközösség: Ásványolaj- és petrolkémiai technológia III. Laboratóriumi gyakorlatok. Egyetemi jegyzet, tanszéki kiadás, Veszprém, 2006.