

Table 1.

Concentration of comonomer C6D, mol %	E_{bend} , MPa	E_{tensile} , MPa	σ_{is} , MPa	ϵ_{pp} , %	σ_{pp} , MPa	KCV, KJ/m ²	T_g , °C	Cross-linking degree %
PDME	1785±83	1725±5	44.0±0.4	163±19	28.2±1.2	5.5±0.2	100	0
1	1813±16	1897±65	44.1±0.3	90±26	29.9±0.3	5.2±0.1	104	91
1.5	1801±8	1975±12	44.3±0.4	56±9	31.0±0.5	5.2±0.3	113	92
2	1823±110	2003±22	44.5±0.2	36±8	31.8±0.1	5.4±0.5	115	93
2.5	1816±5	2020±10	44.3±0.1	21±9	31.7±1.0	5.5±0.3	116	95
3	1943±5	2040±47	44.7±0.6	14±6	31.9±1.0	5.4±0.8	134	97
3.5	1939±116	2083±50	44.6±0.3	11±2	32.0±2.2	5.6±0.3	145	96

The aim of this current study was to synthesis copolymers based on dimethyl esters of bicyclo [2.2.1] hept-5-ene-2,3-dicarboxylic acid and to analyze of their physical and mechanical properties.

Exo,exo-N,N'-hexylene-di(norbornene-2,3-dicarboxyimide) (exo-C6D) were used as a bi-functional co-monomer [3]. Exo-C6D was added to DME in an amount of 1 to 3.5 mol%, copolymerization was carried out in a mass of monomers. Here we used an original catalyst of the Hoveydy-Grubbs type II generation [4] in a weight ratio of catalyst: monomer of 1 : 15,000. The physical and mechanical properties of the samples with different concentration of co-monomer C6D are shown in Table 1.

According this data, it can be seen that the implantation of a bi-functional co-monomer led to an increasing of modulus of flexure and exten-

sional modulus, the glass transition temperature as well. This is due to the formation of a crosslinked structure of co-polymers and an increase in the cross-linking degree. We can observe a decrease in the breaking elongation. With an increasing of the concentration of the implanting exo-C6D the tensile stress at yield and breaking strength do not change. Surprisingly, it was found that Izod impact strength did not change. This is due to the fact that the length of the linker has become larger and, consequently, the mobility of the crosslinked macromolecules of the copolymers has increased. Also, for the same reason, in the polymerization process, exo-C6D can undergo a Ring Opening Metathesis Polymerization not only with crosslinkable polymer chains but also interacting with itself, forming a linear polymer with cyclic fragments.

References

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EXERGY ANALYSIS OF MULTICOMPONENT DISTILLATION

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The aim of the exergy analysis is to estimate thermodynamical efficiency of industrial processes, locate exergy loss areas and improve technology.

The analysis of the exergy and energy efficiency of oil rectification schemes was the main objective of this work. Oil fractionation is the initial and one of the most energy demanding processes of any

petroleum refinery. This is to say that even cases of slight energy efficiency increase of the process will lead to economic benefits.

The following technological schemes with different flow integration levels were taken for the analysis:

- Two column scheme without flows integration

Table 1. Calculation results

Feed stream	Specific exergy, kJ/kg				
	TC-I	TC-II	TC-III	TC-IV	TC-V
Gasoline fraction	179.75	237.14	56.23	55.86	41.95
Diesel fraction	188.27	242.02	263.09	153.34	81.72
Residue	196.87	252.67	469.61	677.23	142.37

(TC-I);

- Two column Petlyuk scheme (TC-II);
- Two column direct sequence scheme (TC-III);
- Two column indirect sequence scheme (TC-IV);
- Two column scheme with distributed distillation and partial heat and material flow integration (TC-V);

For this task to be done the following calculations of specific chemical (ex_C) and physical (ex_p) exergy were carried out:

$$ex_C = I_{rev}^L + I_{rev}^S + I_{rev}^G \quad (1)$$

$$ex_p = ex_T + ex_M \quad (2)$$

I_{rev}^L – exergy of reversal transferring from liquid to vapor, I_{rev}^S – exergy of reversal steam transferring to ideal state, I_{rev}^G – exergy of reversal gas mixture separation work (only for initial oil), ex_p , ex_M – isobaric (thermal) and isothermal (mechanical) parts of physical exergy.

Based on the obtained results we could make it possible to compare energy demands and estimate energy potential of outflows. The calculations let us to choose the most optimal scheme as well as suggest options of heat recuperation.

IMPROVING THE BENZENE ALKYLATION CATALYST PERFORMANCE WITH USE OF COMPUTER MODELING SYSTEM

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Linear alkylbenzene is one of the most common organic feedstocks used in the detergent industry. Linear alkylbenzene sulfonic acids of high molecular weight (245–260) are the anionic surfactants more used in all ranges of household detergents formulation, but especially in heavy duty laundry products, sometimes in combination with nonionics alcohol sulfates from tallow and soap. The ASA technology has almost completely replaced the older technologies for surfactants production due to improved biodegradability and cost-effectiveness. The technology of choice today is dehydrogenation of n-alkanes to n-alkenes followed by benzene alkylation to produce LAB and its further sulphonation.

Our previous researches were devoted to developing of mathematical models for all stages of the ASA manufacturing with due consideration of raw materials composition and links between the apparatuses. According to the above, we proposed to calculate the optimal flow of the HF alkylation catalyst to regeneration taking its current activity

into account.

This includes following consequent stages:

- calculating the amount of dienes produced in

Table 1. Optimal values of HF flow rate to regeneration

HF optimal activity	Amount of heavy aromatics accumulated in the alkylation reactor, kg/h	Required HF flow rate to regeneration, m ³ /h
0.50	23.0	4.1
0.51	23.5	4.2
0.52	24.0	4.3
0.53	24.5	4.3
0.54	25.0	4.4
0.55	25.5	4.5
0.56	26.0	4.5
0.57	26.5	4.6
0.58	27.0	4.6
0.59	27.5	4.7
0.60	28.0	4.7