RESEARCH OF OIL CAPACITY OF CARBON FIBER MATERIALS

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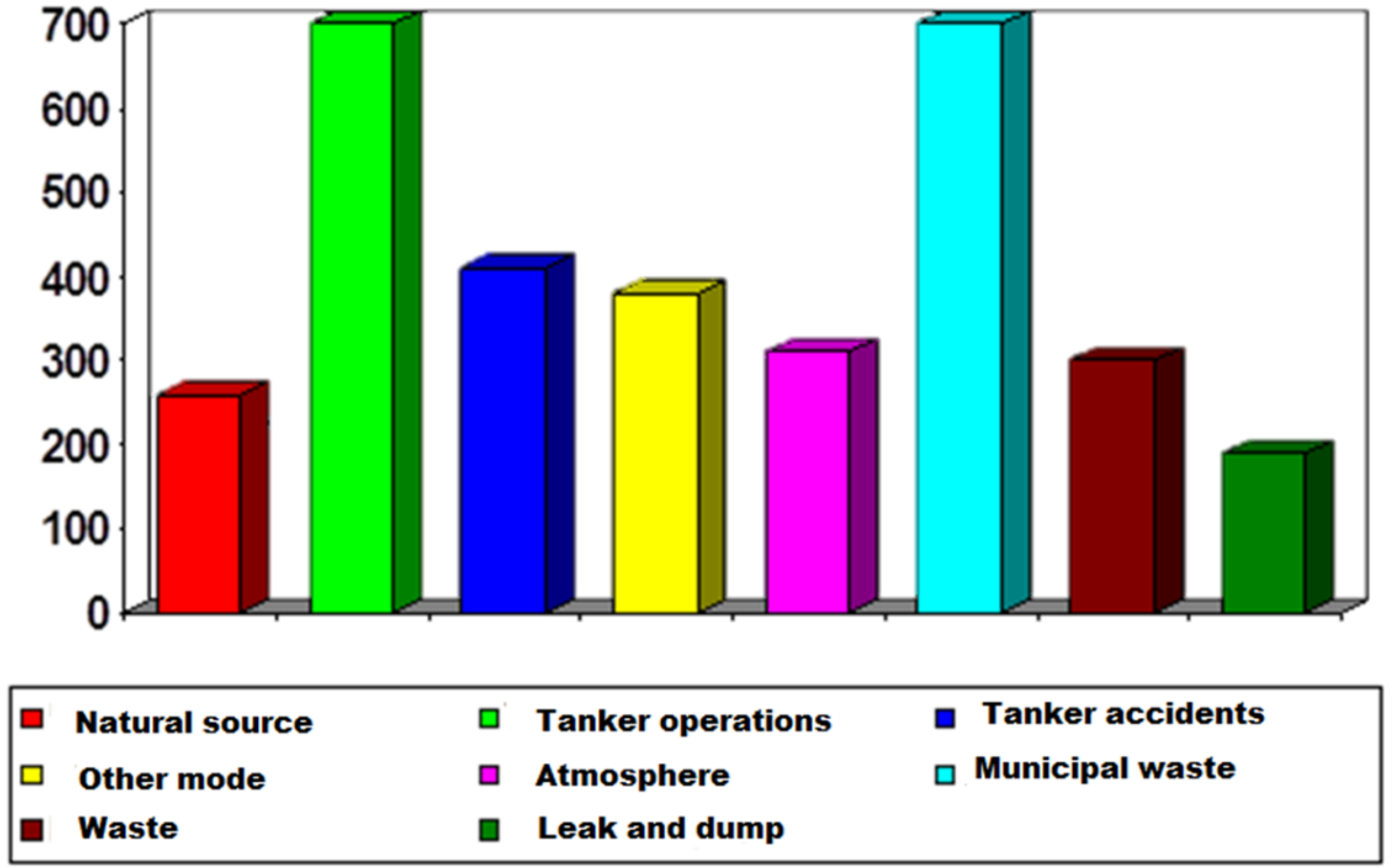
Poster Session

THE ANNUAL DISCHARGE OF PETROLEUM HYDROCARBONS



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Sorption carbon materials of OJSC «SvetlogorskKhimvolokno» Republic of Belarus were studied to collect spilled oil and petroleum products. The specification of the carbon material is presented in Table.

The name of the indicators and their values	Busofit -T	
	040	055
Surface density, gms/m^2	240 ± 25	200±25
Ash content, %, max	0,5	0,5
Breaking strength,, min	350	200
Width of the fabric, cm	49 ±3	48 ±3
Methylene Blue absorption capacity, mg/g, min	250	400
Iodine absorption capacity, %, min	110	130
Benzol vapor margin absorption volume, cm^3/g, min	0,35	0,55

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The calculation of the sorption capacity of oil (HE) was calculated by the formula:

$$\mathrm{HE} = \frac{\rho(V_1 - V_2)}{m};$$

where ρ- oil density, g/cm^3;

V_1 – the volume of oil before the introduction of sorption material, ml;

V_2 – volume of oil after removal of sorption material, ml;

m – weight of the initial dry sorbent, g.

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The results obtained on the oil capacity of the studied carbon materials are presented in Table.

Carbon materials	Mass of the initial tissue, g	Mass after oil sorption, g	Oil capacity of the sorbent, g/g
Felt fabric	1,00	9,20	8,20
TM-4	1,05	3,20	2,00
JT1-22/40	1,10	3,74	2,40
Busofit T-055	0,15	0,95	5,40

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The study of the mobility of petroleum molecules sorbed on carbon tissues was based on the analysis of data from Carr-Purcell-Meiboom-Gill (CPMG) and Magic Sandwich Echo (MSE) pulse experiments. Measurements were carried out on the NMR analyzer "Spin Track" (Resonance Systems GmbH, Germany)

The results of the sorption experiment and the approximation of the CPMG experiment data by the model.

Carbon materials	Oil capacity of the sorbent, g/g	A_1, rel. units.	A_2, rel. units	T_{21}, ms	T_{22}, ms
Felt fabric	6.83	0.335	0.665	12.21	79.46
ТМ-4	1.79	0.375	0.625	14.89	83.07
ЛТ1-22/40	2.41	0.427	0.573	13.25	65.50
Busofit T-055	6.67	0.428	0.572	6.05	45.08

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- The experiments have shown that the carbon materials studied, both non-woven (felt) and woven, have a high oil capacity in relation to oil and petroleum products.

- Incineration for the purpose of cleaning tissues from oil led to only minor changes in the values of NMR relaxation parameters in the MSE experiment. This means that there have been no significant changes in the structure of tissues. As a result, the samples can be reused for oil sorption.

- Carbon materials, both non-woven (felt) and woven in terms of their physical and mechanical properties and oil capacity, can be used as highly effective sorbents in the elimination of emergency oil and petroleum product spills.

Thank you!

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