

Table 1. Characteristics of semicoking tar from Shubarkol coal

Characteristic	Value
Density at 20°C, g/cm ³	1.071
Moisture content, wt %	3.4
Fractional composition, wt %:	
at t_{bo}	130
boiling up to 180°C	2.4
180–330°C	19.0
above 330°C, and losses	78.6
Ash content, wt %	0.11
Content, wt %:	
polyaromatic hydrocarbons components insoluble in:	60.0
toluene	1.3
quinoline	0.2
Elemental composition, wt %:	
C	91.11
H	5.50
S	0.35
N	1.46
O (calculated as the difference)	1.58

semicoking coal tar derived from Shubarkol coal by hydrogenation in the presence of nanoheterogeneous molybdenum-disulfide catalyst synthesized in situ from ammonium para-molybdate [7].

The tar is hydraulically purified at 5.0 MPa and 400°C, with the addition of 0.015% S and 0.05 wt % of nanoheterogeneous Ni-bearing catalyst (calculated in terms of the metal), in a high-pressure laboratory system. Then the hydrogenated tar product obtained in the presence of the Ni-bearing catalyst is filtered at 180°C under a pressure of 1.0 MPa, through belting fabric, with two layers of filter paper. The ash content of the coke is determined in accordance with State Standard GOST 22692–77; the actual density and yield of volatiles are determined in accordance with State Standard GOST 22898–78. Table 2 presents the results of hydrogenation of the semicoking tar from Shubarkol coal in the presence of nickel-sulfide catalyst prepared in situ on the basis of NiNO₃ in coal tar.

To stabilize the highly reactive tar compounds, the tar is enriched by hydrogenation without preliminary distillation, in the presence of a hydrogen donor, by saturation with molecular hydrogen and atomic hydrogen from the hydrogen donor, since those reactions occur at lower temperature than the formation of atomic hydrogen from molecular hydrogen. As we see

Table 2. Characteristics of tar and hydrogenation products

Characteristic	Tar	
	initial	purified
Density at 20°C, g/cm ³	1.071	0.925
Ash content, wt %	0.11	0.04
Moisture content, wt %	3.4	0.62
Fractional composition, wt %:		
at t_{bo}	130	108
up to 180°C	2.4	2.2
180–330°C	19.0	37.0
above 330°C, and losses	78.6	60.8
Content, wt %:		
polyaromatic hydrocarbons components insoluble in quinoline	60.0	47.0
components insoluble in toluene (α_1 fraction):	2.2	1.0
in filtrate	5.3	1.3
in sediment	15.9	41.5
Elemental composition, wt %:		
C	91.11	92.03
H	5.50	6.33
S	0.35	0.12
N	1.46	1.20
O (calculated as the difference)	1.58	0.32