

GRANULOMETRIC COMPOSITION OF THE NANOCATALYTIC ADDITIVES PREPARED

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Eight samples with different particle size distribution were prepared to study the influence of the particle size of the NiO/SiO₂ and Fe₂O₃/SiO₂ catalytic additives deposited on the ferrosphere. Catalytic additives were separated on standard sieves with a bore size of 0.2; 0.16; 0.1; 0.08 mm.

The influence of the granulometric composition of the catalytic additives in the process of thermochemical processing of the tar mixture and PCT was carried out under the following conditions: T-410⁰C, 20% PCT added to tar, holding time 60 min, coke oven gas pressure 3.0 MPa, experiments were carried out in an autoclave with a volume of 0.5 liters.

Experimental results of thermochemical processing of tar and PCT mixtures show that the decrease in the size of the particles of catalytic additives (Sample 1 and 2) promotes the reaction of destruction of the mixture and an increase in the yield of light fractions from 53.7 to 59.7% and 42.4 to 55.2%, respectively. We believe that the high catalytic activity of the sample 1 is caused by an increase in the active contact surface, which the defective structures of nickel oxide can be. In addition, the catalytic activity is affected by the size of the nickel particle, which is 214 nm, and the size of the iron particle in the sample 2 is 1064 nm.

Thus, it is possible that a nanocatalytic additive NiO/SiO₂ applied to a ferrosphere with a particle size of 0 -1.0 mm is the most effective compared to a catalytic addition of Fe₂O₃/SiO₂ deposited on a ferrosphere with similar particle sizes.

References:

1. Thermochemical processing of heavy oil residues in a mixture with the primary coal tar in the atmosphere of coke oven gas: intermediate report on R & D / Karaganda, 2015. - 132 p. - State registration № 0125PK00935.
2. KOPYTOV, M.N., and GOLOVKO, A.K. 2013. Thermal transformations of high-molecular components of heavy oil residues. *Petrochemistry*, **53** (1), pp.16-21.
3. SUVOROV, Yu.P. 2006. Hydrogenation of Remains of Oil Refining under Various Conditions. *Chemistry of Solid Fuel*, (4), pp. 52-60.
4. BATYZHEV, E.A. 2005. Efficiency of the stage of liquid-phase thermal destruction of oil residues. *Chemistry and Technology of Fuels and Oils*, (3), pp. 24-26.