
INVESTIGATION OF THE FACTORS CAUSING THE WORKING ABSORBENT OIL TO BE THICKENED DURING VISCOSITY MEASUREMENT

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Incomplete utilization of coke oven equipment and formation of tar with an unacceptably high content of quinoline-insoluble substances lead to a shortage of absorbent oil required for the recovery of benzene hydrocarbons from coke oven gas. To reduce the consumption of absorbent oil, it is necessary to extend the service life of the oil in the plant, but this leads to its thickening, affects the corrosion resistance of the equipment and contributes to coke formation on heating surfaces. The deterioration of absorbent oil is caused by polymerization of components, oxidation, and reactions with other substances, and these processes can also affect the extraction of benzene. To find out the reasons for the thickening of working oil, it is important to study how it behaves when coal tar components are added. A comparative analysis of the rheological behavior of mixtures of "fresh oil + tar" and "fresh oil + indene-coumarone resin" with recycled working oil was carried out. The rheological characteristics of the studied oils were determined on a Brookfield DV2T rotational viscometer with a thermocouple at a fixed temperature of thermostating and variable shear rate. Studies of rheological behavior have shown that the loss of fluidity of the working oil occurs mainly due to the polymerization of unsaturated hydrocarbons of coke oven gas and absorbent oil, rather than due to the introduction of tar's substances. Among the individual aromatic components that contribute to the loss of oil fluidity, polar rather than high molecular weight compounds have the greatest negative impact. The practical significance of the results is that due to oil regeneration, the flow mode at low shear rates is close to ideal fluids. This means that at low fluid flow rates, for example, when oil flows freely through the packing of a benzene scrubber, the viscosity of fresh oil is higher than that of the regenerated sample.

Keywords: absorbent oil, indene-coumarone resin, viscosity, aromatic components, coal tar.

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