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TREATMENT OF HYDROCARBON OILS

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6 Claims. (Cl. 196—10)

This invention relates to the treatment of hydrocarbon oils and has to do particularly with the treatment of hydrocarbon oils with sulfuric acid, while in the presence of a substantial amount of isobutane.

The hydrocarbon oils to be treated according to the invention are those commonly subjected to acid treatment for the removal of impurities, such as gasoline and naphtha.

An object of the invention is to purify the oil by removal of undesirable constituents and at the same time to obtain improvement in the quality of the oil by interaction of the isobutane with unsaturated constituents of the oil to produce new ingredients having desirable properties for improving the characteristics of the treated oil.

In the refining of hydrocarbon oils, such as those of petroleum origin, it is common practice to subject the oils to the action of sulfuric acid to remove the unstable color, gum producing and carbon forming bodies. It has been found that an advantageous method of operation is to treat the oil with sulfuric acid in the presence of isobutane in excess of that naturally occurring in the oils.

In practicing the invention the isobutane is incorporated into the oil and the mixture then contacted with the treating reagent. The amount of reagent may be the same as that customarily used for refining purposes, although better results are often obtained by using a somewhat larger amount. The temperatures employed may be those commonly used in the particular treating method. In acid treatment, low temperatures, for example 100° F. or lower, are preferred. It is preferable to use sufficient pressure to maintain the oils in the liquid phase, although in the case of the lower boiling oils vapor phase treatment may be used. Pressures of 50 to 500 pounds are ordinarily sufficient and ordinarily about 75 to 150 pounds are satisfactory.

In carrying out the operation of the invention with sulfuric acid, a strong or concentrated acid up to 100% has been found satisfactory. We prefer to use about 94% acid. The temperature may vary from about 0° to 100° F. and preferably about 70 to 90° F. The amount of isobutane added will vary according to the charge stock. As a rule the maximum amount of isobutane, in mols, will be approximately double the quantity of unsaturated compounds, in mols, in the charge stock. For a cracked distillate a beneficial effect may be obtained with as little as 5% by weight of isobutane. For a greater increase in yield and octane value as high as 100% by weight may be used.

Pressures from atmospheric to 150 pounds may be used, depending on the amount of isobutane and vapor pressure of the original oil. It is necessary to use only sufficient pressure to maintain the mixture in the liquid phase. Any well known or preferred method of contacting the mixture with the acid may be used. The amount of acid may vary between about 3 and 50 pounds per barrel of oil and preferably about 5 to 10 pounds per barrel.

As an example of the operation of the invention, a cracked distillate having an unsaturated hydrocarbon content of about 25% was treated with 5 pounds per barrel of 94% sulfuric acid. The acid treated product was neutralized and redistilled to the end point of the original oil. A loss of about 5% and a decrease in the antiknock of about 3 points occurred. By treating a sample of the same distillate in substantially the same manner except 25% of isobutane was added to the distillate prior to treating, a substantial gain in yield occurred and the antiknock value increased about 2 points.

The improvements are believed to be due to interaction of the oils with the isobutane to produce alkylated products.

This application is a continuation of pending application Serial No. 148,979, filed June 18, 1937.

Obviously many modifications and variations of the invention, as hereinbefore set forth, may be made without departing from the spirit and scope thereof and therefore only such limitations should be imposed as are indicated in the appended claims.

We claim:

1. A process for the treatment of cracked hydrocarbon distillates of the class of gasoline and naphtha, which comprises contacting the cracked distillate with concentrated sulfuric acid in the presence of added isobutane in amount larger than the quantity of unsaturated compounds originally present in said distillate, the concentration of the acid and the amount of isobutane being such as to effect alkylation of the isobutane with normally liquid olefins originally present in the cracked distillate whereby the distillate is refined and the yield of treated product is greater than normally occurs without the presence of the added isobutane.

2. A process according to claim 1 in which the concentration of the acid is about 94 to 100%.

3. A process according to claim 1 in which the temperature is about 0° to 100° F.

4. A process according to claim 1 in which suffi-

cient pressure is used to maintain the added isobutane in the liquid phase.

5. The process of alkylating a normally liquid cracked naphtha fraction to increase its anti-knock value, which comprises treating the said cracked naphtha fraction with added isobutane in amount substantially greater than the quantity of unsaturated compounds present in said fraction in the presence of concentrated sulfuric acid under alkylating conditions, whereby isobutane 10

reacts with the normally liquid olefins originally present in said cracked naphtha fraction to produce liquid alkylation products.

6. The process according to claim 5, in which the said cracked naphtha fraction and the said added isobutane are substantially devoid of normally gaseous olefins.

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