Odor formation is inhibited in paraffin hydrocarbon compositions with normal boiling points within the range of from about 70°F. to about 700°F. by the addition of a small amount of a bis(alkylhydroxybenzy1) ether.

4 Claims, No Drawings
ODOR INHIBITION FOR PARAFFIN HYDROCARBONS

BACKGROUND OF THE INVENTION

This invention relates to paraffin hydrocarbons. In one of its aspects, this invention relates to odor formation in paraffin hydrocarbon compositions. In another of its aspects this invention relates to the inhibition of odor formation in paraffin hydrocarbon compositions. In one of its concepts this invention relates to the inhibition of an odor formation in paraffin hydrocarbon compositions by the addition of bis(alkylhydroxybenzyl) ether to the paraffin hydrocarbon composition.

"Odorless mineral spirits" which are generally marketed for use as paint thinner, insecticide carrier oil, charcoal lighter fluid, industrial cleaning compounds, and solvents are generally composed of a mixture of paraffin hydrocarbons boiling within the range of from about 70°F to about 700°F. Under shelf storage conditions which include temperatures of up to 125°F or even higher, uninhibited "odorless mineral spirits" do not tend to remain odorless. It is, therefore, common practice to add an agent effective for inhibiting odor formation to commercial mixtures of these hydrocarbons. We have discovered that certain bis(alkylhydroxybenzyl) ethers added in small amounts to paraffin hydrocarbons will inhibit the formation of odor bodies.

It is therefore an object of this invention to provide a paraffin hydrocarbon composition stabilized against odor formation. It is also an object of this invention to provide a method for stabilizing paraffin hydrocarbon compositions against odor formation.

Other aspects, concepts and objects of this invention are apparent from the study of the disclosure and the appended claims.

SUMMARY OF THE INVENTION

According to the invention, odor formation in paraffin hydrocarbon compositions is inhibited by the addition of at least one bis(alkylhydroxybenzyl) ether. In one of the embodiments of this invention an odor inhibited composition of matter comprising at least one paraffin hydrocarbon and at least one bis(alkylhydroxybenzyl) ether is provided.

Materials that can be inhibited against odor formation by the process of this invention are paraffin hydrocarbon compositions having normal boiling points within the range of from about 70°F to about 700°F. Although individual hydrocarbons boiling within this range can be inhibited by the process of this invention, the process of this invention will usually be applied to mixtures of hydrocarbons boiling within the given range. Paraffin hydrocarbons boiling within the range of from about 240°F to about 345°F such as the hydrocarbon mixtures Soltrol® 50 and Soltrol® 100, marketed by Phillips Petroleum Company, have been found to be particularly well adapted to this method of odor inhibition.

EXEMPLARY

Tests were made wherein a sample (A) of Soltrol® 50 (boiling range of 240°F-300°F) with 0.05 weight percent (500 ppm) bis(3,5-di-tert-butyl-4-hydroxybenzyl) ether and a sample (B) of Soltrol® 50 alone were placed in separate bombs in an ASTM apparatus for oxidation stability of gasoline (ASTM Designation: D-525-55). Oxygen was introduced into the bombs until a pressure of 100 psig was attained and then the bombs were placed in hot water baths at 210°F. The pressure reached 120 psig at 210°F. The percent oxygen used in the 3-day period of the tests was calculated from the pressure drop on the bomb at various time intervals.

The control (Soltrol® 50 alone) (B) had a strong oxidized hydrocarbon odor (ketone-like odor) while (A) the Soltrol® 50 with 0.05 weight percent bis(3,5-di-tert-butyl-4-hydroxybenzyl) ether was water clear and odorless.

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The bis(alkylhydroxybenzyl) ethers that have been found suitable as odor inhibiting agents for paraffin hydrocarbon compositions are those having the structural formula:

\[
\begin{align*}
R' & \text{ and } R \text{ are alkyl groups having one to four carbon atoms, and the } R' \text{ s are branched or linear alkyl groups. Examples of such compounds are: bis(3,5-di-tertiary-butyl-4-hydroxybenzyl) ether; bis(3,5-dimethyl-4-hydroxybenzyl) ether; and bis(2-ethyl-4-isopropyl-3-hydroxybenzyl) ether.} \\
& \text{It has been found that even a trace of the odor-stabilizing bis(alkylhydroxybenzyl) ether compounds described above is sufficient to stabilize a paraffin hydrocarbon composition. Usually, an amount in the range of between about 0.005 and 0.50 weight percent is used. A more preferable amount is in the range of about 0.01 to about 0.20 weight percent based on the weight of the paraffin hydrocarbon composition being odor-stabilized. Larger amounts can be used, if desired, but we have not found the use of larger amounts necessary.} \\
& \text{Since the odor-stabilizing bis(alkylhydroxybenzyl) ethers are soluble in paraffin hydrocarbons in amounts in the range stated above, special means for introducing the bis(alkylhydroxybenzyl) ether into the hydrocarbons are unnecessary.} \\
& \text{The cause of odor formation in paraffin hydrocarbons has been determined to be the formation of oxidation products which develop upon storage of the hydrocarbons probably because of oxidation of the small amount of unsaturated hydrocarbon impurities which are associated with their production and not completely separable from the paraffin hydrocarbons. The example below is offered to show the effectiveness of a bis(alkylhydroxybenzyl) ether in preventing oxidation and, therefore, odor formation in a mixture of paraffin hydrocarbons.}
\end{align*}
\]

<table>
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<tr>
<th>No. of Days</th>
<th>% of Oxygen Consumed</th>
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<td>B</td>
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</tr>
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Reasonable variation and modification are possible within the scope of the foregoing disclosure and the appended claims the essence of which is that the addition
of bis(alkylhydroxybenzyl) ether to paraffin hydrocarbons with normal boiling points within the range of from about 70°F to about 700°F, will prevent the formation of odor bodies in the composition.

I claim:

1. An odor stabilized composition of matter consisting essentially of a major proportion of at least one paraffin hydrocarbon having a normal boiling point within the range of from about 70°F to about 700°F, a minor proportion of oxidizable, unsaturated hydrocarbon impurities and an oxidation stabilizing amount of bis(3,5-di-tert-butyl-4-hydroxybenzyl) ether.

2. A composition of matter of claim 1 wherein the bis(3,5-di-tert-butyl-4-hydroxybenzyl) ether is present in an amount in the range of about 0.005 to about 0.50 weight percent based on the weight of the paraffin hydrocarbons present.

3. A method for inhibiting odor formation in paraffin hydrocarbon compositions consisting essentially of a major proportion of at least one paraffin hydrocarbon having a normal boiling point within the range of from about 70°F to about 700°F, and a minor portion of oxidizable, unsaturated hydrocarbon impurities, said method comprising stabilizing the composition with an oxidation inhibiting amount of bis(3,5-di-tert-butyl-4-hydroxybenzyl) ether.

4. A method of claim 3 wherein the bis(3,5-di-tert-butyl-4-hydroxybenzyl) ether is present in an amount in the range of about 0.005 to about 0.50 weight percent based on the weight of the paraffin hydrocarbons present.