

Description

This invention relates to a process for preparing compositions which may be used as hydrocarbon oil additives and more particularly as pour point depressant compositions. The invention also encompasses concentrates, fuel oils, oils of lubricating viscosity, automatic transmission fluids, gear oils, hydraulic oils, crude oils and residual oils containing the compositions.

Various types of distillate fuel oils such as diesel fuels, various oils of lubricating viscosity, automatic transmission fluids, hydraulic oil, home heating oils, and crude oils require the use of pour point depressant additives in order to allow them to flow freely at low temperatures. The use of such additives has been known for some time. For example, U.S. Patent 1,867,214 to Michel discloses the use of a fuel additive which includes a mono-alkyl-naphthalene and a poly-alkyl-naphthalene. The additives disclosed within this patent are produced by alkylating naphthalene in the presence of an aluminum chloride catalyst.

U.S. Patent 1,815,022 to Davis discloses a similar additive which comprises naphthalene substituted with a chlorinated wax. The chlorinated wax is added to the naphthalene in the presence of an aluminum chloride catalyst.

The pour point depressants, as disclosed by Michel and Davis, were utilized in oils which included higher amounts of kerosene than is normally present in such oils today. Kerosene acts as a solvent for the wax present in distillate fuel oils. However, demands for kerosene for use in jet fuels has caused the amount of kerosene present in distillate fuel oils to be decreased over the years. This, in turn, has required the addition of wax crystal modifiers which are increasingly efficient in order to make up for the lack of the kerosene.

An additive combination for cold flow improvement of distillate fuel oils is disclosed within U.S. Patent 3,910,776 to Feldman. The combination includes alkyl aromatics which are the condensation product of a chlorinated wax and naphthalene with an ethylene-containing polymer and an N-alkylphatic hydrocarbyl succinimic acid.

U.S. Patent 3,883,318 to Feldman, et al. discloses another pour point depressant which comprises a mixture of compounds such as a hydrogenated wax aromatic pour point depressant, a hydrogenated alkyl aromatic fraction of an amorphous normal solid wax and an ethylene backbone pour point depressant.

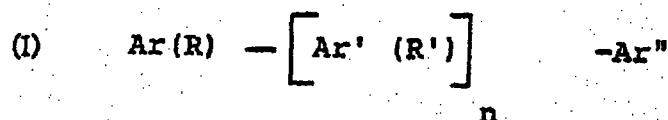
U.S. Patent 4,255,159 to Miller, et al. contains the disclosure of an additive which is a mixture of different types of cold flow property improving compounds. The additive is disclosed as having synergistic flow and filterability improving properties with respect to fuel oils. The additive may comprise :

- (1) a polymer of isomerized monoolefins or the alkylation product of naphthalene with the polymeric monoolefin, and
- (2) the condensation product of a chlorinated paraffin and an aromatic hydrocarbon which may also be naphthalene.

This combination of two different types of substituted naphthalene compounds used as a fuel additive is indicated as having synergistic effects with respect to improving the cold flow and filterability properties of present day fuel oils.

A process for making a class of additives which act as pour point depressants, and concentrates and oils containing same are disclosed herein. The compositions prepared according to the present invention may include a large number of different compounds. Compounds in the compositions may have an extremely wide range of molecular weights. The compositions aid in improving the cold flow and filterability of present day oils such as lubricating oils, diesel fuel oils, crudes and heating oils.

In accordance with the invention there is provided a process for the preparation of a composition comprising a mixture of compounds having the general structural formula (I) :



(wherein Ar, Ar' and Ar'', which may be the same or different, each represents an aromatic moiety containing 1 to 3 aromatic rings and each aromatic moiety may be substituted with 0 to 3 substituents (the aromatic rings are preferably benzene rings which may be linked but are preferably fused) ; R and R', which may be the same or different, each represents an alkylene containing about 1 to 100 carbon atoms, and n is 0 to 1000) which comprises

- (a) providing aromatic compounds containing 1 to 3 aromatic rings, which compounds may be substituted with 0 to 3 substituents, the compounds being precursors for aromatic moieties Ar, Ar' and Ar'', in a reactor;

- (b) adding a FRIEDEL-CRAFTS or Lewis Acid catalyst to the reactor ;
 (c) adding a chlorinated hydrocarbon (preferably a chlorinated hydrocarbon containing 18 to 50 carbon atoms) to the reactor ;
 (d) adding an olefin (preferably an olefin containing 8 to 30 carbon atoms) to the reactor ;
 (e) adding CH_2Cl_2 to the reactor, wherein step (e) is carried out concurrently with or prior to at least one of steps (a)-(d).

The "alkylene" linking groups (R) and (R') are substantially hydrocarbyl which may be saturated hydrocarbon radicals, e.g., methylene CH_2 or ethylene C_2H_4 ; hydrocarbon radicals containing unsaturated groups, i.e., alkenyls ; and such saturated and unsaturated hydrocarbons substituted with chlorine. The term "alkylene" as used herein is intended to cover the above.

We have found it possible in accordance with the invention to prepare a class of compositions which when added to a hydrocarbon oil in relatively small amounts will act as pour point depressants.

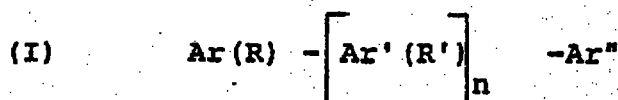
A feature of the present invention is that the compositions prepared by the invention can be added to hydrocarbon oil by themselves, without the addition of other pour point depressants, in order to obtain greatly improved cold flow and filtering properties.

Another feature of the present invention is that the compounds in the composition generally have molecular weights over a very wide range.

An advantage of the present invention is that the compositions can be easily and economically manufactured and added to a lubricant to act as a pour point depressant without the need for other pour point depressant additives.

These and other objects, features and advantages of the present invention will become apparent to those skilled in the art upon reading the present disclosure.

The pour point depressant compounds in the compositions prepared by the present invention can be described by the general structural formula (I) :



as defined above. The Ar, Ar' and Ar'' are rings, preferably fused benzene rings. Any substituent on the aromatic moieties is preferably derived from an olefin containing 8 to 30 carbon atoms, more preferably 16-18 carbon atoms, or from a chlorinated hydrocarbon containing 8 to 50 carbon atoms, more preferably containing about 24 carbon atoms and about 2.5 chlorine atoms for each 24 carbon atoms.

The compositions comprise a mixture of compounds encompassed by the general structural formula (I) set forth above. It is not generally possible to readily determine what percentage of the compounds would be present in the composition.

The compositions might include compounds having molecular weights ranging from 300 to 2,000, but preferably contains compounds ranging in molecular weight from 500 to 10,000 and most generally contains compounds over an even broader molecular weight range of 271 to 300,000. A composition containing compounds over a broader molecular weight range results in better pour point depressant properties.

A preferred aromatic precursor for groups Ar, Ar' and Ar'' is naphthalene.

The compositions produced by the process of the invention may include compounds such as alkylated naphthalenes. The compositions are characterised by the presence of compounds over a wide molecular weight range. The molecular weight of compounds in the composition could vary from that of a simple unsubstituted benzene to a polymer of 1000 monomers of trisubstituted naphthalenes linked by alkylenes containing as many as 100 carbon atoms with the substituents of the naphthalene containing 1 to 50 carbon atoms.

The substituents for the aromatic moieties of (I) are derived from olefins and/or chlorinated hydrocarbons.

Examples of useful olefins include 1-octene, 1-decene, and alpha-olefins of chain lengths C_{12} , C_{14} , C_{16-18} , C_{15-20} , C_{20-24} , C_{24-28} . More preferably the process of the invention is carried out with olefins which are mixtures of the above. A good example would be C_{15-20} cracked wax olefins, or a mixture of 1-octene and C_{16-18} alpha olefin.

Chlorinated hydrocarbons might contain from 1-50 carbon atoms and from 2 to 84% chlorine by weight. Preferred chlorinated hydrocarbons are obtained by chlorinating slack waxes or paraffinic waxes of C_{18-30} chain length so that they contain from 5-50% chlorine by weight. A particularly preferred chlorinated hydrocarbon, is one of about 24 carbons containing about 2.5 chlorines per 24 carbon atoms.

Although Ar, Ar' and Ar'' may be any aromatic group containing 1 to 3 aromatic rings, it is preferable if Ar, Ar' and Ar'' are all the same. Further, it is preferable if Ar, Ar' and Ar'' are fused benzene rings, i.e., when two

or three benzene rings are present, the adjoining rings share two carbon atoms. Most preferably, Ar, Ar' and Ar'' are all derived from naphthalene.

Aromatics which may be precursors of Ar, Ar' and Ar'' include benzene, biphenyl, diphenylmethane, triphenylmethane, aniline, diphenylamine, diphenylether, phenol, naphthalene, anthracene and phenanthrene.

5 Naphthalene is particularly preferred.

Although the aromatic groups in formula (I) above can contain 0 to 3 substituents, the composition will generally contain compounds with one or two substituents and will preferably include compounds with two substituents. The substituents may be derived from any olefin (preferably an alpha olefin containing 8 to 30 carbon atoms) or derived from a chlorinated hydrocarbon containing 8 to 50 carbon atoms (preferably a chlorinated hydrocarbon derived from a hydrocarbon wax containing 22-26 carbon atoms). In addition to or in place of forming the substituents, the olefin and/or chlorinated hydrocarbon may form the alkylene linking group (R and/or R' group) of the general structural formula (I). Compositions of the invention might include compounds wherein each of the naphthalene groups is substituted with one alkyl group containing 16 to 18 carbon atoms and one derived from a chlorinated hydrocarbon containing about 24 carbon atoms with about 2.5 chlorine atoms present for each 24 carbon atoms.

15 A pour point depressant of the present invention includes a mixture of compounds in a composition prepared by the process of the invention.

A preferred material is a mixture of products which include alkylated naphthalenes, coupled and bridged naphthalenes, oligomers and dehydrohalogenated waxes. The MW Distribution of the final product is generally a more useful characterization of the final product. A useful MW range is from 300-2000. A more useful MW range is from 500 to 10,000. A preferred distribution is from 400 to 112,000. The most general distribution is from 271 to 300,000.

As indicated above, compositions which include compounds of general formula (I) may be produced according to the following general process :

- 25 (a) providing aromatic compounds containing 1 to 3 aromatic rings which compounds are substituted with 0 to 3 substituents, the compounds being precursors for aromatic moieties Ar, Ar' and Ar'', in a reactor ;
- (b) adding a FRIEDEL-CRAFTS or Lewis Acid catalyst to the reactor ;
- (c) adding a chlorinated hydrocarbon to the reactor ;
- (d) adding an olefin to the reactor and
- 30 (e) adding CH_2Cl_2 to the reactor wherein step (e) is carried out prior to or concurrently with at least one step of (a)-(d).

As indicated above, the aromatic compounds forming Ar, Ar' and Ar'' groups in the compound of the general formula are preferably naphthalene. If the aromatic compound is substituted, it is substituted with an alkyl or alkenyl, either of which may be chlorine substituted, branched or straight chain. Accordingly, in accordance with one embodiment of the process of the present invention, naphthalene is mixed with methylene chloride in a reaction flask. At this point, the methylene chloride acts as a solvent. A FRIEDEL-CRAFTS or Lewis Acid catalyst is then added to the mixture. The catalyst is preferably in the form of AlCl_3 . After adding the catalyst, a chlorinated hydrocarbon (most preferably one containing 22-26 carbons) is added to the reaction flask and a reaction occurs between the naphthalene and the chlorinated hydrocarbon wax such that the naphthalene is substituted with an alkyl group derived from the chlorinated hydrocarbon wax. Furthermore, linking will occur between naphthalene compounds via a methylene group as shown within general structural formula (I) when (R) or (R') is CH_2 .

The mixture is then preferably cooled to a temperature in the range of 0° to 5°C . While continuing to cool the vessel, an olefin (preferably an alpha-olefin containing 8 to 30 carbon atoms) is added slowly so that the temperature is continually maintained in the range of 0° to 5°C . Alkylation of the naphthalene compounds occurs so that the naphthalenes are substituted with an alkyl group derived from said olefin. The catalyst is decomposed and is neutralized with a base such as lime after which stirring is continued while the temperature is raised first to 60°C and then to 120°C to remove the volatile components of the reaction mixture. The mixture is filtered and the desired product is isolated.

50 Chlorinated hydrocarbons which may form a substituent on one or more of the aromatic moieties may contain 1 to 50 carbon atoms. If a chlorinated hydrocarbon containing 50 carbon atoms forms a substituent and is linked to another 50 carbon atom substituent on another aromatic moiety, the aromatic moieties will be linked by an alkylene containing 100 carbons, i.e., (R) or (R') is about 100 carbon atoms in general formula (I). However, the aromatic moieties Ar may be linked by a single CH_2 , i.e., an alkylene containing a single carbon atom wherein (R) or (R') is CH_2 .

55 The general process of the invention for producing the composition of general formula (I) can be carried out over a wide range of ratios of components. To describe the ratio of the components added in steps (a), (b), (c), (d) and (e) the components will be referred to respectively by the letters (a'), (b'), (c'), (d') and (e'). All that

is necessary is that (e') be present in sufficient amount so that at least some methylene linking occurs between components (a') and/or that (b'), (c') and (d') be present in sufficient amounts so that there is at least some substitution of (a') by (c') and (d') a : catalyzed by (b'). The components (a'), (b'), (c'), (d') and (e') might be present in weight ratios of (a') : (b') : (c') : (d') : (e') in the ranges of about (1) : (.01-1) : (0.5-6) : (0.5-22) : (1-40) and most preferably (1) : (0.2) : (3) : (11) : (20) ; all ratios are in parts by weight.

The process can be carried out over a wide range of temperatures above the freezing point and up to the boiling points of the reaction mixture present at any point in steps (a)-(e). The boiling point of (e'), i.e., methylene chloride is about 40°C, however, the maximum reaction temperature may be higher or lower than 40°C at atmospheric pressure due to the presence of other reactants. The process has been carried out at as low as -5°C. The reaction can also be carried out at subatmospheric or superatmospheric pressure.

The pour point depressant (PPD) compositions of the present invention may be sold by itself or in concentrates, in combination with any other known additive which includes, but is not limited to dispersants, detergents, antioxidants, antiwear agents, extreme pressure agents, emulsifiers, demulsifiers, friction modifiers, anti-rust agents, corrosion inhibitors, viscosity improvers, dyes, and solvents to improve handleability which may include alkyl and/or aryl hydrocarbons. These additives may be present in various amounts depending on the needs of the final product.

The concentrate might contain 0.01 to 90% by weight of the PPD. The PPD may be present in a final product, blend or concentrate in (in a minor amount, i.e., up to 50% by weight) any amount effective to act as a pour point depressant but is preferably present in crude oils, residual oils, oil of lubricating viscosity, hydraulic oils, fuel oils or automatic transmission fluids in an amount of from about 0.0025 to about 4%, preferably 0.05 to about 2% by weight.

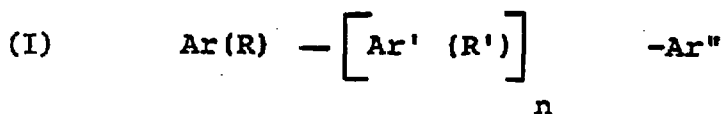
EXAMPLE 1 (All parts are parts by weight)

Naphthalene is mixed with seven parts of CH_2Cl_2 and 0.2 parts of AlCl_3 . Chlorinated hydrocarbon (2.7 parts) is added slowly into the reaction mixture at 15°C. The reaction mixture is held for 5 hours at ambient temperature or until the release of HCl is complete. The mixture is then cooled to about 5°C and 7.3 parts of an alpha olefin mixture is added over 2 hours while maintaining the temperature of the reaction mixture between 0 and 10°C.

The catalyst is decomposed by the careful addition of 0.8 parts 50% aqueous NaOH. The aqueous layer is separated and the organic layer is purged with N_2 and heated to 14°C at 400 Pa (3 mm Hg) to remove the volatiles. The residue is filtered to yield 97% of the theoretical yield weight of the product.

Claims

1. A process for the preparation of a composition comprising a mixture of compounds having the general structural formula (I) :



(wherein Ar, Ar' and Ar'', which may be the same or different, each represents an aromatic moiety containing 1 to 3 aromatic rings and each aromatic moiety may be substituted with 0 to 3 substituents ; R and R', which may be the same or different, each represents an alkylene containing 1 to 100 carbon atoms, and n is 0 to 1000) which comprises

- (a) providing aromatic compounds containing 1 to 3 aromatic rings, which compounds may be substituted with 0 to 3 substituents, the compounds being precursors for aromatic moieties Ar, Ar' and Ar'', in a reactor;
- (b) adding a FRIEDEL-CRAFTS or Lewis Acid catalyst to the reactor ;
- (c) adding a chlorinated hydrocarbon to the reactor ;
- (d) adding an olefin to the reactor ;
- (e) adding CH_2Cl_2 to the reactor, wherein step (e) is carried out concurrently with or prior to at least one of steps (a)-(d).

2. A process as claimed in claim 1, wherein step (e) is carried out concurrently with or prior to step (c) or step (d), the aromatic compounds include naphthalene, the olefin contains 16 to 18 carbon atoms and the chlorinated hydrocarbon contains 20 to 26 carbon atoms

3. A process as claimed in either of claims 1 and 2, wherein the catalyst is AlCl_3 , step (c) is carried out



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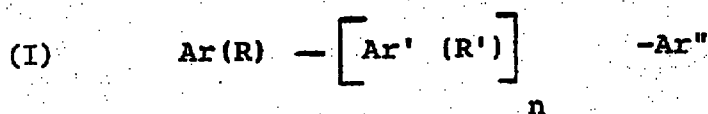
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- providing aromatic compounds containing 1 to 3 aromatic rings, which compounds may be substituted with 0 to 3 substituents, the compounds being precursors for aromatic moieties Ar, Ar' and Ar'', in a reactor;
- adding a FRIEDEL-CRAFTS or Lewis Acid catalyst to the reactor;
- adding a chlorinated hydrocarbon to the reactor;
- adding an olefin to the reactor;
- adding CH_2Cl_2 to the reactor, wherein step (e) is carried out concurrently with or prior to at least one of steps (a)-(d).

2. A process as claimed in claim 1, wherein step (e) is carried out concurrently with or prior to step (c) or step (d), the aromatic compounds include naphthalene, the olefin contains 16 to 18 carbon atoms and the chlorinated hydrocarbon contains 20 to 26 carbon atoms

3. A process as claimed in either of claims 1 and 2, wherein the catalyst is AlCl_3 , step (c) is carried out

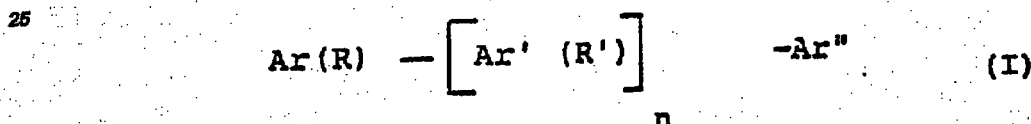


prior to step (d) and the container contents are cooled after step (c) and prior to step (d) to a temperature of 0°C to 5°C and the olefin is slowly added so as to maintain the temperature at 0°C to 5°C during the addition of the olefin.

4. A process as claimed in any one of claims 1 to 3 further comprising the steps of :
 5 deactivating the catalyst after completing steps (a)-(e) ; neutralizing ;
 heating to a temperature in the range of 50°C to 130°C to remove volatile components ; and
 filtering and recovering the composition having the mixture of compounds therein which have the general
 structural formula (II) and which include compounds having a molecular weight ranging from 271 to
 300,000.
- 10 5. A concentrate comprising from 0.1 to 90% by weight of a composition produced by a process as claimed
 in any one of claims 1 to 4.
6. A hydrocarbon oil composition comprising a major portion of a distillate petroleum fraction and from
 0.0025 to 4 weight percent of a composition produced by a process as claimed in any one of claims 1 to 4.
7. A crude oil composition comprising a major portion of a natural crude oil and 0.0025 to 4 weight percent
 15 of a composition produced by a process as claimed in any one of claims 1 to 4.
8. A lubricating composition comprising a major amount of an oil of lubricating viscosity and 0.0025 to 4
 weight percent of a composition produced by a process as claimed in any one of claims 1 to 4.

20 Ansprüche

1. Verfahren zur Herstellung einer Zusammensetzung, welche ein Gemisch von Verbindungen der allge-
 meinen Strukturformel (I) umfaßt :



30 (In der Ar, Ar' und Ar'', die gleich oder verschieden sein können, jeweils eine aromatische Einheit mit 1 bis 3
 aromatischen Ringen bedeuten und jede aromatische Einheit mit 0 bis 3 Substituenten substituiert sein kann,
 R und R', die gleich oder verschieden sein können, jeweils einen Alkylrest mit 1 bis 100 Kohlenstoffatomen
 darstellen, und n 0 bis 1000 ist), welches umfaßt

- 35 (a) die Bereitstellung von aromatischen Verbindungen mit 1 bis 3 aromatischen Ringen in einem Reaktor,
 wobei die Verbindungen mit 0 bis 3 Substituenten substituiert sein können und wobei die Verbindungen
 Vorstufen für die aromatischen Einheiten Ar, Ar' und Ar'' sind ;
- (b) Zugabe eines Friedel-Crafts- oder Lewis-Säuren-Katalysators in den Reaktor ;
- (c) Zugabe eines chlorierten Kohlenwasserstoffes in den Reaktor ;
- 40 (d) Zugabe eines Olefins in den Reaktor ;
- (e) Zugabe von CH₂Cl₂ in den Reaktor, wobei die Stufe
 (e) gleichzeitig mit oder vor mindestens einer der Stufen (a) bis (d) durchgeführt wird.

2. Verfahren nach Anspruch 1, wobei die Stufe (e) gleichzeitig mit oder vor Stufe (c) oder Stufe (d) durch-
 geführt wird, die aromatischen Verbindungen Naphthalin einschließen, das Olefin etwa 16 bis 18 Kohlenstoff-
 45 atome enthält und der chlorierte Kohlenwasserstoff 20 bis 25 Kohlenstoffatome enthält.

3. Verfahren nach einem der Ansprüche 1 und 2, wobei der Katalysator AlCl₃ ist, die Stufe (c) vor der Stufe
 (d) durchgeführt wird und der Behälterinhalt nach Stufe (c) und vor Stufe (d) auf eine Temperatur von 0 bis
 5°C abgekühlt wird, und das Olefin langsam zugegeben wird, so daß die Temperatur während der Zugabe des
 Olefins auf 0 bis 5°C gehalten wird.

4. Verfahren nach einem der Ansprüche 1 bis 3, ferner umfassend die Stufen der :
 50 Deaktivierung des Katalysators nach dem Abschluß der Stufen (a) bis (e) ;
 Neutralisierung ;
 Erwärmung auf eine Temperatur im Bereich von 50 bis 130°C zur Entfernung von flüchtigen Bestandteilen ;
 und Filterung und Gewinnung der Zusammensetzung, die ein Gemisch von Verbindungen enthält, welche
 55 die allgemeine Strukturformel (II) aufweisen und Verbindungen mit einem Molekulargewicht von 271 bis
 30000 einschließen.

5. Konzentrat, umfassend 0,1 bis 90 Gew.-% einer Zusammensetzung, hergestellt nach einem Verfahren
 gemäß einem der Ansprüche 1 bis 4.



6. Kohlenwasserstofföl-Zusammensetzung, umfassend einen größeren Anteil einer Erdöl-Destillat-Fraktion und etwa 0,0025 bis etwa 4 Gew.-% einer Zusammensetzung, hergestellt nach einem Verfahren nach einem der Ansprüche 1 bis 4.

7. Rohöl-Zusammensetzung, umfassend einen größeren Anteil eines natürlichen Rohöls und etwa 0,0025 bis etwa 4 Gew.-% einer Zusammensetzung, hergestellt nach einem Verfahren nach einem der Ansprüche 1 bis 4.

8. Schmiermittel, umfassend einen größeren Anteil eines Öls mit Schmierviskosität und etwa 0,0025 bis etwa 4 Gew.-% einer Zusammensetzung, hergestellt nach einem Verfahren nach einem der Ansprüche 1 bis 4.

Revendications

1. Un procédé pour la préparation d'une composition comportant un mélange de composés présentant la formule structurale générale (I) :



(dans laquelle Ar, Ar' et Ar'', qui peuvent être identiques ou différents, représentent individuellement une partie aromatique renfermant de 1 à 3 cycles aromatiques et chaque partie aromatique peut être substituée avec de 0 à 3 substituants ; R et R', qui peuvent être identiques ou différents, représentent individuellement un alkylène renfermant environ 1 à 100 atomes de carbone, et n varie de 0 à 1000), dans lequel :

(a) on prévoit des composés aromatiques renfermant de 1 à 3 cycles aromatiques, ces composés pouvant être substitués avec de 0 à 3 substituants, les composés étant des précurseurs pour les parties aromatiques Ar, Ar' et Ar'', dans un réacteur ;

(b) on ajoute un catalyseur de FRIEDEL-CRAFTS ou à base d'acide de Lewis dans le réacteur ;

(c) on ajoute un hydrocarbure chloré dans le réacteur ;

(d) on ajoute une oléfine dans le réacteur ;

(e) on ajoute CH_2Cl_2 dans le réacteur, ce stade

(e) étant réalisé conjointement avec ou avant au moins l'une des étapes (a)-(d).

2. Un procédé tel que revendiqué dans la revendication 1, dans lequel l'étape (e) est mise en oeuvre conjointement avec ou avant l'étape (c) ou l'étape (d), les composés aromatiques comprennent du naphtalène, l'oléfine contient d'environ 16 à 18 atomes de carbone et l'hydrocarbure chloré contient de 20 à 26 atomes de carbone.

3. Un procédé tel que revendiqué dans l'une quelconque des revendications 1 et 2, dans lequel le catalyseur est $AlCl_3$, l'étape (c) est mise en oeuvre avant l'étape (d) et le contenu du réacteur est refroidi après l'étape (c) et avant l'étape (d) jusqu'à une température de 0° à 5°C et l'oléfine est lentement agitée de façon à maintenir la température de 0°C à 5°C pendant l'addition de l'oléfine.

4. Un procédé tel que revendiqué dans l'une quelconque des revendications 1 à 3, comprenant en outre les étapes de :

- désactivation du catalyseur une fois terminée les étapes (a)-(e) ;

- neutralisation ;

- chauffage à une température dans la gamme de 50°C à 130°C afin d'éliminer les constituants volatils ;

et

- filtration et récupération de la composition présentant le mélange de composés tels, formule générale structurale (II) et qu'ils comprennent des composés présentant un poids moléculaire se situant dans la gamme de 271 à 300000.

5. Un concentré comportant de 0,1 à 90% en poids d'une composition obtenue par un procédé tel que revendiqué dans l'une quelconque des revendications 1 à 4.

6. Une composition d'huile d'hydrocarbure, comportant une partie prépondérante d'une fraction de distillat du pétrole et de 0,0025 à 4% en poids d'une composition préparée par un procédé tel que revendiqué dans l'une quelconque des revendications 1 à 4.

7. Une composition d'huile brute comportant une partie prépondérante d'une huile naturelle brute et de 0,0025 à 4% en poids d'une composition préparée par un procédé tel que revendiqué dans l'une quelconque des revendications 1 à 4.

8. Une composition lubrifiante comportant une quantité prépondérante d'une huile de viscosité lubrifiante et de 0,0025 à 4% en poids d'une composition préparée par un procédé tel que revendiqué dans l'une quel-



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conque des revendications 1 à 4.

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