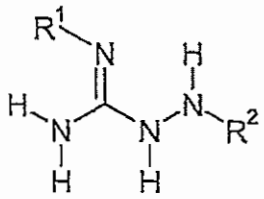
Claims

1. The use of the reaction product formed from (a) a hydrocarbyl-substituted dicarboxylic acid whose hydrocarbyl radical has 8 to 250 carbon atoms, or the anhydride thereof, and (b) a nitrogen compound of the general formula I



(I)

or a salt of the nitrogen compound I, where R^1 and R^2 are each independently hydrogen or a C_1- to C_{20}-hydrocarbyl radical,

as an additive in a fuel for reducing fuel consumption in the operation of a spark-ignited internal combustion engine with this fuel or as an additive in a gasoline fuel for reduction of fuel consumption in the operation of a self-ignition internal combustion engine with this fuel.

2. The use according to claim 1, wherein the hydrocarbyl-substituted dicarboxylic acid of component (a) is based on succinic acid or the anhydride thereof.

3. The use according to claim 1 or 2, wherein the hydrocarbyl substituent in component (a) is a linear or branched C_8- to C_{40}-alkyl or -alkenyl radical or a polyisobutenyl radical having 24 to 250 carbon atoms.

4. The use according to claims 1 to 3, wherein the nitrogen compound of component (b) is unsubstituted aminoguanidine hydrogencarbonate.

5. A fuel composition comprising, in a major amount, a gasoline fuel and, in a minor amount, at least one reaction product formed from (a) a hydrocarbyl-substituted dicarboxylic acid and (b) a nitrogen compound of the general formula I according to claims 1 to 4, and at least one fuel additive which is different than the reaction product mentioned and has detergent action.

6. The fuel composition according to claim 5, comprising as the fuel additive which is different than the reaction product mentioned and has detergent action at least one representative selected from:

   (Da) mono- or polyamino groups having up to 6 nitrogen atoms, at least one nitrogen atom having basic properties;

(Db) nitro groups, optionally in combination with hydroxyl groups;

(Dc) hydroxyl groups in combination with mono- or polyamino groups, at least one nitrogen atom having basic properties;

(Dd) carboxyl groups or their alkali metal or alkaline earth metal salts;

(De) sulfonic acid groups or their alkali metal or alkaline earth metal salts;

(Df) polyoxy-C_2-C_4-alkylene moieties terminated by hydroxyl groups, mono- or polyamino groups, at least one nitrogen atom having basic properties, or by carbamate groups;

(Dg) carboxylic ester groups;

(Dh) moieties derived from succinic anhydride and having hydroxyl and/or amino and/or amido and/or imido groups; and/or

(Di) moieties obtained by Mannich reaction of substituted phenols with aldehydes and mono- or polyamines.

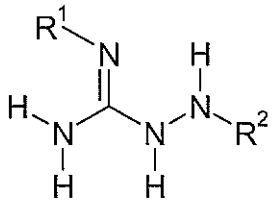
7. The fuel composition according to claim 5 or 6, additionally comprising, as a further fuel additive in a minor amount, at least one carrier oil.

8. The fuel composition according to claims 5 to 7, additionally comprising, as a further fuel additive in a minor amount, at least one corrosion inhibitor.

9. An additive concentrate comprising at least one reaction product formed from (a) a hydrocarbyl-substituted dicarboxylic acid or anhydride thereof and (b) a nitrogen compound of the general formula I according to claims 1 to 4, and at least one fuel additive which is different than the reaction product mentioned and has detergent action.

Claims

1. The use of the reaction product formed from (a) a hydrocarbyl-substituted dicarboxylic acid whose hydrocarbyl radical is a linear or branched C_8- to C_{40}-alkyl or -alkenyl radical or a polyisobutenyl radical having 24 to 250 carbon atoms, or the anhydride thereof, and (b) a nitrogen compound of the general formula I



(I)

or a salt of the nitrogen compound I, where R^1 and R^2 are each independently hydrogen or a C_1- to C_{20}-hydrocarbyl radical,

together with at least one fuel additive which is different than the reaction product mentioned and has detergent action, which possess at least one hydrophobic hydrocarbyl radical having a number-average molecular weight (M_n) of 85 to 20 000 and at least one polar moiety,

as an additive in a fuel for reducing fuel consumption in the operation of a spark-ignited internal combustion engine with this fuel or as an additive in a gasoline fuel for reduction of fuel consumption in the operation of a self-ignition internal combustion engine with this fuel.

2. The use according to claim 1, wherein the hydrocarbyl-substituted dicarboxylic acid of component (a) is based on succinic acid or the anhydride thereof.

3. The use according to claims 1 to 2, wherein the nitrogen compound of component (b) is unsubstituted aminoguanidine hydrogencarbonate.

4. A fuel composition comprising, in a major amount, a gasoline fuel and, in a minor amount, at least one reaction product formed from (a) a hydrocarbyl-substituted dicarboxylic acid and (b) a nitrogen compound of the general formula I as defined in claims 1 to 3, and at least one fuel additive which is different than the reaction product mentioned and has detergent action, which possess at least one hydrophobic hydrocarbyl radical having a number-average molecular weight (M_n) of 85 to 20 000 and at least one polar moiety.

5. The fuel composition according to claim 4, comprising as the fuel additive which is different than the reaction product mentioned and has detergent action at least one representative selected from:

(Da) mono- or polyamino groups having up to 6 nitrogen atoms, at least one nitrogen atom having basic properties;

(Db) nitro groups, optionally in combination with hydroxyl groups;

(Dc) hydroxyl groups in combination with mono- or polyamino groups, at least one nitrogen atom having basic properties;

(Dd) carboxyl groups or their alkali metal or alkaline earth metal salts;

(De) sulfonic acid groups or their alkali metal or alkaline earth metal salts;

(Df) polyoxy-C_2-C_4-alkylene moieties terminated by hydroxyl groups, mono- or polyamino groups, at least one nitrogen atom having basic properties, or by carbamate groups;

(Dg) carboxylic ester groups;

(Dh) moieties derived from succinic anhydride and having hydroxyl and/or amino and/or amido and/or imido groups; and/or

(Di) moieties obtained by Mannich reaction of substituted phenols with aldehydes and mono- or polyamines.

6. The fuel composition according to claim 4 or 5, additionally comprising, as a further fuel additive in a minor amount, at least one carrier oil.

7. The fuel composition according to claims 4 to 6, additionally comprising, as a further fuel additive in a minor amount, at least one corrosion inhibitor.

8. A fuel additive concentrate comprising at least one reaction product formed from (a) a hydrocarbyl-substituted dicarboxylic acid or anhydride thereof and (b) a nitrogen compound of the general formula I as defined in claims 1 to 3, and at least one fuel additive which is different than the reaction product mentioned and has detergent action, which possess at least one hydrophobic hydrocarbyl radical having a number-average molecular weight (M_n) of 85 to 20 000 and at least one polar moiety.