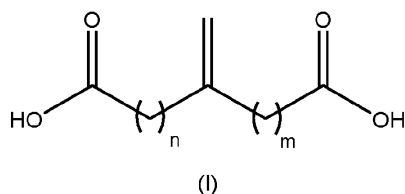


Claims

1. A fuel composition comprising as an additive the reaction product of a polycarboxylic acid compound of formula (I):

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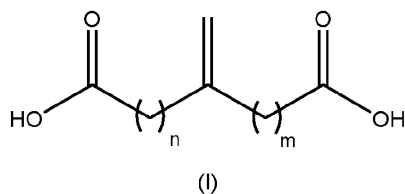


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or an anhydride thereof; and an alcohol having at least 5 carbon atoms; wherein each of n and m may be 0 or a positive integer.

2. A method of improving the performance of an engine, the method comprising combusting in the engine a fuel composition comprising as an additive the reaction product of a polycarboxylic acid compound of formula (I):

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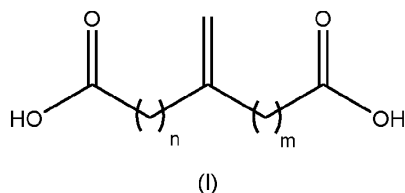


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or an anhydride thereof; and an alcohol having at least 5 carbon atoms; wherein each of n and m may be 0 or a positive integer.

3. The use of the reaction product of a polycarboxylic acid compound of formula (I):

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or an anhydride thereof; and an alcohol having at least 5 carbon atoms; wherein each of n and m may be 0 or a positive integer; as an additive for a fuel composition to improve the performance of an engine combusting said fuel composition.

- 5 4. A composition, method or use according to any preceding claim wherein the polycarboxylic acid or anhydride thereof is selected from itaconic acid, itaconic anhydride, 2-methylene glutaric acid, 2-methylene glutaric anhydride, 2-methylene adipic acid, 2-methylene adipic anhydride and isomers and/or mixtures thereof.
- 10 5. A composition, method or use according to any preceding claim wherein the polycarboxylic acid is itaconic acid.
6. A composition, method or use according to claim 6 wherein the alcohol is selected from:
 - 15 - alkanols of formula $\text{CH}_3(\text{CH}_2)_x\text{OH}$ or an isomer thereof wherein x is from 4 to 23, preferably from 9 to 19;
 - branched or cyclic alkyl alcohols in which n is 0;
 - alkenyl alcohols in which n is 0;
 - glycol ethers in which n is not 0.
- 20 7. A composition, method or use according to claim 6 wherein the alcohol is selected from an
 - an alcohol of formula R^1OH wherein R^1 is a (preferably branched) alkyl group having 8 to 30 carbon atoms;
 - an alcohol of formula R^1OH wherein R^1 is an alkenyl group having 8 to 30 carbon atoms; and
 - 25 - an alcohol of formula $\text{H}-(\text{OR})_n-\text{OR}^1$ wherein n is from 1 to 24, R is ethylene, propylene or isopropylene, and R^1 is an unsubstituted alkyl group having 8 to 30, preferably 12 to 24, carbon atoms.
8. A composition, method or use according to any preceding claim wherein the alcohol is
 - 30 selected from hexanol, octanol, nonanol, decanol, dodecanol, tetradecanol, cetyl alcohol, stearyl alcohol, 2-ethyl-1-butanol, 2-ethyl-1-hexanol, 2-ethyl-1-heptanol, 2-propylheptanol, 2-ethyl-1-decanol, 2-hexyl-1-decanol, 2-octyl-1-decanol, 2-hexyl-1-dodecanol, 2-octyl-1-dodecanol, 2-decyl-1-tetradecanol, isotridecanol, cyclohexanol, cyclooctanol, benzyl alcohol, citronellol, oleyl alcohol, 9-decen-1-ol, cis-3-hexen-1-ol, trans-2-hexen-1-ol, 5-hexen-1-ol, 6-methyl-5-hepten-2-ol, 1-octen-3-ol, trans-2-octen-1-ol, 10-undecen-1-ol and
 - 35 compounds of formula $\text{CH}_3(\text{CH}_2)_x\text{O}(\text{CH}_2\text{CH}(\text{CH}_3)\text{O})_y\text{H}$ or an isomer thereof wherein x is from 10 to 15, and y is from 10 to 20.

9. A composition, method or use according to any preceding claim wherein the polycarboxylic acid compound and the alcohol are reacted in a molar ratio of from 2:1 to 1:2.
- 5 10. A composition, method or use according to any preceding claim wherein the additive has an acid value of from 0.6 to 9.7 mmol H+/g, preferably from 1.3 to 7.1 mmol H+/g, more preferably from 1.6 to 6.2 mmol H+/g.
- 10 11. A composition, method or use according to any preceding claim wherein the fuel composition is a diesel fuel composition, which optionally comprises one or more further additives selected from:
- (i) a quaternary ammonium salt additive;
 - 15 (ii) the product of a Mannich reaction between an aldehyde, an amine and an optionally substituted phenol;
 - (iii) the reaction product of a carboxylic acid-derived acylating agent and an amine;
 - 20 (iv) the reaction product of a carboxylic acid-derived acylating agent and hydrazine;
 - (v) a salt formed by the reaction of a carboxylic acid with di-n-butylamine or tri-n-butylamine;
 - 25 (vi) the reaction product of a hydrocarbyl-substituted dicarboxylic acid or anhydride and an amine compound or salt which product comprises at least one amino triazole group; and
 - (vii) a substituted polyaromatic detergent additive; and
 - 30 (viii) partial esters of substituted succinic acids.
12. A composition, method or use according to claim 11 wherein the diesel fuel composition further comprises a quaternary ammonium salt additive; preferably wherein the
- 35 quaternary ammonium salt additive is the reaction product of a nitrogen-containing species having at least one tertiary amine group and a quaternising agent wherein the nitrogen containing species is the reaction product of a hydrocarbyl-substituted acylating agent and a compound comprising at least one tertiary amine group and a primary amine,

secondary amine or alcohol group; preferably wherein the quaternising agent is an ester quaternising agent.

- 5 13. A composition, method or use according to any preceding claim wherein the fuel composition is a gasoline fuel composition, which optionally comprises one or more further additives selected from:
- 10 (p) hydrocarbyl – substituted polyoxyalkylene amines or polyetheramines;
(q) acylated nitrogen compounds which are the reaction product of a carboxylic acid-derived acylating agent and an amine;
(r) hydrocarbyl-substituted amines wherein the hydrocarbyl substituent is substantially aliphatic and contains at least 8 carbon atoms;
(s) Mannich base additives comprising nitrogen-containing condensates of a phenol,
15 aldehyde and primary or secondary amine;
(t) aromatic esters of a polyalkylphenoxyalkanol;
(u) an additional quaternary ammonium salt additive; and
(v) tertiary hydrocarbyl amines having a maximum of 30 carbon atoms.
- 20 14. A method or use according to any of claims 2 to 13 which combats deposits in the engine.
15. A method or use according to any of claims 2 to 14 wherein the engine is a diesel engine, preferably a modern diesel engine having a high pressure fuel system.
- 25 16. A method or use according to claim 15 wherein the improvement in performance is selected from one or more of:
- 30 - a reduction in power loss of the engine;
- a reduction in external diesel injector deposits;
- a reduction in internal diesel injector deposits;
- an improvement in fuel economy;
- a reduction in fuel filter deposits;
- a reduction in emissions; and
- an increase in maintenance intervals.
- 35 17. A method or use according to any of claims 2 to 16 which combats internal diesel injector deposits.

18. A method or use according to any of claims 2 to 17 which achieves a maximum exhaust temperature deviation of less than 30°C in the DW10C test.
19. A method or use according to any of claims 2 to 14 wherein the engine is a gasoline engine, preferably a direct injection spark ignition engine.
20. A method or use according to claim 19 wherein the improvement in performance is selected from one or more of:
- improved fuel economy
 - reduced maintenance
 - less frequent overhaul or replacement of injectors
 - improved driveability
 - improved power
 - improved acceleration
21. A method or use according to any of claims 2 to 20 which achieves "keep clean" performance.
22. A method or use according to any of claims 2 to 21 which achieves "clean up" performance.