Claims

1. A plasticizer for polymers comprising a triester of cyclohexanetripropionic acid, in which the three alcohol moieties of the three ester groups each comprise 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12 carbon atoms, and optionally at least one other polymer-plasticizing compound.

2. The plasticizer according to Claim 1, wherein the triester of cyclohexanetripropionic acid is a triester of cyclohexane-1,2,4-tripropionic acid or a triester of cyclohexane-1,3,5-tripropionic acid.

3. The plasticizer according to Claim 1 or 2, wherein the alcohol moieties, besides the oxygen of the ester function, do not comprise any other heteroatoms, and contain no multiple bonds.

4. The plasticizer according to any of Claims 1 to 3, wherein all alcohol moieties present in one molecule have identical empirical formulae and at the same time identical or different structural formulae.

5. The plasticizer according to any of Claims 1 to 4, wherein the triester of cyclohexanetripropionic acid is provided as a mixture of at least two triesters of cyclohexanetripropionic acid.

6. The plasticizer according to Claim 5, wherein the at least two triesters of cyclohexanetripropionic acid differ in their empirical formulae and/or in their structural formulae.

7. The plasticizer according to any of Claims 1 to 6, wherein the triester of cyclohexanetripropionic acid is selected from the group consisting of:

tri(*n*butyl) cyclohexane-1,2,4-tripropionate, tri(methylpropyl) cyclohexane-1,2,4-tripropionate, tri(*n*pentyl) cyclohexane-1,2,4-tripropionate, tri(*iso*pentyl) cyclohexane-1,2,4-tripropionate, tri(2-methylbutyl) cyclohexane-1,2,4-tripropionate, tri(3-methylbutyl) cyclohexane-1,2,4-tripropionate, tri(*n*hexyl) cyclohexane-1,2,4-tripropionate, tri(*iso*hexyl) cyclohexane-1,2,4-tripropionate, tri(*n*heptyl) cyclohexane-1,2,4-tripropionate, tri(*iso*heptyl) cyclohexane-1,2,4-tripropionate, tri(*n*octyl) cyclohexane-1,2,4-tripropionate, tri(*iso*octyl) cyclohexane-1,2,4-tripropionate, tri(2-ethylhexyl) cyclohexane-1,2,4-tripropionate, tri(*n*nonyl) cyclohexane-1,2,4-tripropionate, tri(*iso*nonyl) cyclohexane-1,2,4-tripropionate, tri(*n*decyl) cyclohexane-1,2,4-tripropionate, tri(*iso*decyl) cyclohexane-1,2,4-tripropionate, tri(2-propylheptyl) cyclohexane-1,2,4-tripropionate,

tri(*n*butyl) cyclohexane-1,3,5-tripropionate, tri(methylpropyl) cyclohexane-1,3,5-tripropionate, tri(*n*pentyl) cyclohexane-1,3,5-tripropionate, tri(*iso*pentyl) cyclohexane-1,3,5-tripropionate, tri(2-methylbutyl) cyclohexane-1,3,5-tripropionate, tri(3-methylbutyl) cyclohexane-1,3,5-tripropionate, tri(*n*hexyl) cyclohexane-1,3,5-tripropionate, tri(*iso*hexyl) cyclohexane-1,3,5-tripropionate, tri(*n*heptyl)

cyclohexane-1,3,5-tripropionate, tri(*iso*heptyl) cyclohexane-1,3,5-tripropionate, tri(*n*octyl) cyclohexane-1,3,5-tripropionate, tri(*iso*octyl) cyclohexane-1,3,5-tripropionate, tri(2-ethylhexyl) cyclohexane-1,3,5-tripropionate, tri(*n*nonyl) cyclohexane-1,3,5-tripropionate, tri(*iso*nonyl) cyclohexane-1,3,5-tripropionate, tri(*n*decyl) cyclohexane-1,3,5-tripropionate, tri(*iso*decyl) cyclohexane-1,3,5-tripropionate and tri(2-propylheptyl) cyclohexane-1,3,5-tripropionate.

8. A composition comprising the plasticizer according to any of Claims 1 to 7 and one or more polymers.

9. A composition comprising a triester of cyclohexanetripropionic acid, and one or more polymers, in which the three alcohol moieties of the three ester groups each comprise 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12 carbon atoms.

10. The composition according to Claim 9, wherein the triester of cyclohexanetripropionic acid is a triester of cyclohexane-1,2,4-tripropionic acid or a triester of cyclohexane-1,3,5-tripropionic acid.

11. The composition according to Claim 9 or 10, wherein the alcohol moieties, besides the oxygen of the ester function, do not comprise any other heteroatoms, and contain no multiple bonds.

12. The composition according to any of Claims 9 to 11, wherein all alcohol moieties present in one molecule have identical empirical formulae and at the same time identical or different structural formulae.

13. The composition according to any of Claims 9 to 12, wherein the triester of cyclohexanetripropionic acid is provided as a mixture of at least two triesters of cyclohexanetripropionic acid.

14. The composition according to Claim 13, wherein the at least two triesters of cyclohexanetripropionic acid differ in their empirical formulae and/or in their structural formulae.

15. The composition according to any of Claims 9 to 14, wherein the triester of cyclohexanetripropionic acid is selected from the group consisting of:

tri(*n*butyl) cyclohexane-1,2,4-tripropionate, tri(methylpropyl) cyclohexane-1,2,4-tripropionate, tri(*n*pentyl) cyclohexane-1,2,4-tripropionate, tri(*iso*pentyl) cyclohexane-1,2,4-tripropionate, tri(2-methylbutyl) cyclohexane-1,2,4-tripropionate, tri(3-methylbutyl) cyclohexane-1,2,4-tripropionate, tri(*n*hexyl) cyclohexane-1,2,4-tripropionate, tri(*iso*hexyl) cyclohexane-1,2,4-tripropionate, tri(*n*heptyl) cyclohexane-1,2,4-tripropionate, tri(*iso*heptyl) cyclohexane-1,2,4-tripropionate, tri(*n*octyl) cyclohexane-1,2,4-tripropionate, tri(*iso*octyl) cyclohexane-1,2,4-tripropionate, tri(2-ethylhexyl) cyclohexane-1,2,4-tripropionate, tri(*n*nonyl) cyclohexane-1,2,4-tripropionate, tri(*iso*nonyl)

cyclohexane-1,2,4-tripropionate, tri(*n*decyl) cyclohexane-1,2,4-tripropionate, tri(*iso*decyl) cyclohexane-1,2,4-tripropionate, tri(2-propylheptyl) cyclohexane-1,2,4-tripropionate,

tri(*n*butyl) cyclohexane-1,3,5-tripropionate, tri(methylpropyl) cyclohexane-1,3,5-tripropionate, tri(*n*pentyl) cyclohexane-1,3,5-tripropionate, tri(*iso*pentyl) cyclohexane-1,3,5-tripropionate, tri(2-methylbutyl) cyclohexane-1,3,5-tripropionate, tri(3-methylbutyl) cyclohexane-1,3,5-tripropionate, tri(*n*hexyl) cyclohexane-1,3,5-tripropionate, tri(*iso*hexyl) cyclohexane-1,3,5-tripropionate, tri(*n*heptyl) cyclohexane-1,3,5-tripropionate, tri(*iso*heptyl) cyclohexane-1,3,5-tripropionate, tri(*n*octyl) cyclohexane-1,3,5-tripropionate, tri(*iso*octyl) cyclohexane-1,3,5-tripropionate, tri(2-ethylhexyl) cyclohexane-1,3,5-tripropionate, tri(*n*nonyl) cyclohexane-1,3,5-tripropionate, tri(*iso*nonyl) cyclohexane-1,3,5-tripropionate, tri(*n*decyl) cyclohexane-1,3,5-tripropionate, tri(*iso*decyl) cyclohexane-1,3,5-tripropionate and tri(2-propylheptyl) cyclohexane-1,3,5-tripropionate.

16. The composition according to any of Claims 8 to 15, wherein at least one polymer is selected from the group consisting of polyvinyl chloride, polyalkyl methacrylate (PAMA), polyvinyl butyral (PVB), polyurethane, polysulfide, polylactic acid (PLA), polyhydroxybutyral (PHB), nitrocellulose and copolymers of vinyl chloride with vinyl acetate or with butyl acrylate.

17. The composition according to any of Claims 8 to 16, wherein said composition is a constituent of an adhesive, of a sealing compound, of a coating composition, of a lacquer, of a paint, of a plastisol, of a dryblend, of a foam, of a synthetic leather, of a floor covering, particularly the top layer or foam layer thereof, of a roofing membrane, of an underbody protection, of a fabric coating, of a cable, of a wire insulation, of a hose, of an extruded article, of a film, of an article in the automotive interior sector, of a wallpaper, of an ink, of a toy, of a contact sheet, of a food packaging or of a medical article, especially of a tube or of a blood bag.

18. Use of a triester of cyclohexanetripropionic acid as plasticizer for polymers, especially for PVC, in which the three alcohol moieties of the three ester groups each comprise 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12 carbon atoms.

19. The use according to Claim 18, wherein the triester of cyclohexanetripropionic acid is a triester of cyclohexane-1,2,4-tripropionic acid or a triester of cyclohexane-1,3,5-tripropionic acid.

20. The use according to Claim 18 or 19, wherein the alcohol moieties, besides the oxygen of the ester function, do not comprise any other heteroatoms, and contain no multiple bonds.

21. The use according to any of Claims 18 to 20, wherein all alcohol moieties present in one molecule have identical empirical formulae and at the same time identical or different structural formulae.

22. The use according to any of Claims 18 to 21, wherein the triester of cyclohexanetripropionic acid is provided as a mixture of at least two triesters of cyclohexanetripropionic acid

23. The use according to Claim 22, wherein the at least two triesters of cyclohexanetripropionic acid differ in their empirical formulae and/or in their structural formulae.

24. The use according to any of Claims 18 to 23, wherein the triester of cyclohexanetripropionic acid is selected from the group consisting of:

tri(*n*butyl) cyclohexane-1,2,4-tripropionate, tri(methylpropyl) cyclohexane-1,2,4-tripropionate, tri(*n*pentyl) cyclohexane-1,2,4-tripropionate, tri(*iso*pentyl) cyclohexane-1,2,4-tripropionate, tri(2-methylbutyl) cyclohexane-1,2,4-tripropionate, tri(3-methylbutyl) cyclohexane-1,2,4-tripropionate, tri(*n*hexyl) cyclohexane-1,2,4-tripropionate, tri(*iso*hexyl) cyclohexane-1,2,4-tripropionate, tri(*n*heptyl) cyclohexane-1,2,4-tripropionate, tri(*iso*heptyl) cyclohexane-1,2,4-tripropionate, tri(*n*octyl) cyclohexane-1,2,4-tripropionate, tri(*iso*octyl) cyclohexane-1,2,4-tripropionate, tri(2-ethylhexyl) cyclohexane-1,2,4-tripropionate, tri(*n*nonyl) cyclohexane-1,2,4-tripropionate, tri(*iso*nonyl) cyclohexane-1,2,4-tripropionate, tri(*n*decyl) cyclohexane-1,2,4-tripropionate, tri(*iso*decyl) cyclohexane-1,2,4-tripropionate, tri(2-propylheptyl) cyclohexane-1,2,4-tripropionate,

tri(*n*butyl) cyclohexane-1,3,5-tripropionate, tri(methylpropyl) cyclohexane-1,3,5-tripropionate, tri(*n*pentyl) cyclohexane-1,3,5-tripropionate, tri(*iso*pentyl) cyclohexane-1,3,5-tripropionate, tri(2-methylbutyl) cyclohexane-1,3,5-tripropionate, tri(3-methylbutyl) cyclohexane-1,3,5-tripropionate, tri(*n*hexyl) cyclohexane-1,3,5-tripropionate, tri(*iso*hexyl) cyclohexane-1,3,5-tripropionate, tri(*n*heptyl) cyclohexane-1,3,5-tripropionate, tri(*iso*heptyl) cyclohexane-1,3,5-tripropionate, tri(*n*octyl) cyclohexane-1,3,5-tripropionate, tri(*iso*octyl) cyclohexane-1,3,5-tripropionate, tri(2-ethylhexyl) cyclohexane-1,3,5-tripropionate, tri(*n*nonyl) cyclohexane-1,3,5-tripropionate, tri(*iso*nonyl) cyclohexane-1,3,5-tripropionate, tri(*n*decyl) cyclohexane-1,3,5-tripropionate, tri(*iso*decyl) cyclohexane-1,3,5-tripropionate and tri(2-propylheptyl) cyclohexane-1,3,5-tripropionate.

25. The use according to any of Claims 18 to 24, wherein a triester of cyclohexanetripropionic acid, the alcohol moieties of which each comprise 7 to 12 carbon atoms, is used as polymer-plasticizing compound in high temperature applications.

26. The use according to any of Claims 18 to 24, wherein a triester of cyclohexanetripropionic acid, the alcohol moieties of which each comprise 2 to 9 carbon atoms, is used as polymer-plasticizing compound in plastisol applications.

27. Preparation of triesters of cyclohexanetripropionic acid by
    - ring hydrogenation of the corresponding triester of benzenetripropionic acid,
    - transesterification of the trialkyl ester of the cyclohexanetripropionic acid with at least one alcohol comprising 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12 carbon atoms, wherein the alcohol of the alcohol moiety of the trialkyl ester to be incorporated is higher boiling than the alcohol of the alcohol moiety which is to be replaced in the context of the transesterification,
    - esterification of cyclohexanetripropionic acid with at least one alcohol comprising 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12 carbon atoms or
    - alkoxycarbonylation of trivinylcyclohexane with at least one alcohol comprising 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12 carbon atoms,

    in which the three alcohol moieties of the three ester groups in the triesters of cyclohexanetripropionic acid each comprise 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12 carbon atoms.

28. The method according to Claim 27, wherein the triester of cyclohexanetripropionic acid is a triester of cyclohexane-1,2,4-tripropionic acid or a triester of cyclohexane-1,3,5-tripropionic acid.

29. The method according to Claim 27 or 28, wherein the alcohol moieties, besides the oxygen of the ester function, do not comprise any other heteroatoms, and contain no multiple bonds.

30. The method according to any of Claims 27 to 29, wherein all alcohol moieties present in one molecule have identical empirical formulae and at the same time identical or different structural formulae.

31. The method according to any of Claims 27 to 30, wherein the triester of cyclohexanetripropionic acid is provided as a mixture of at least two triesters of cyclohexanetripropionic acid

32. The method according to Claim 31, wherein the at least two triesters of cyclohexanetripropionic acid differ in their empirical formulae and/or in their structural formulae.

33. The method according to any of Claims 27 to 32, wherein the triester of cyclohexanetripropionic acid is selected from the group consisting of:

tri(*n*butyl) cyclohexane-1,2,4-tripropionate, tri(methylpropyl) cyclohexane-1,2,4-tripropionate, tri(*n*pentyl) cyclohexane-1,2,4-tripropionate, tri(*iso*pentyl) cyclohexane-1,2,4-tripropionate, tri(2-methylbutyl) cyclohexane-1,2,4-tripropionate, tri(3-methylbutyl) cyclohexane-1,2,4-tripropionate, tri(*n*hexyl) cyclohexane-1,2,4-tripropionate, tri(*iso*hexyl) cyclohexane-1,2,4-tripropionate, tri(*n*heptyl) cyclohexane-1,2,4-tripropionate, tri(*iso*heptyl) cyclohexane-1,2,4-tripropionate, tri(*n*octyl) cyclohexane-1,2,4-tripropionate, tri(*iso*octyl) cyclohexane-1,2,4-tripropionate, tri(2-ethylhexyl) cyclohexane-1,2,4-tripropionate, tri(*n*nonyl) cyclohexane-1,2,4-tripropionate, tri(*iso*nonyl)

cyclohexane-1,2,4-tripropionate, tri(*n*decyl) cyclohexane-1,2,4-tripropionate, tri(*iso*decyl) cyclohexane-1,2,4-tripropionate, tri(2-propylheptyl) cyclohexane-1,2,4-tripropionate,

tri(*n*butyl) cyclohexane-1,3,5-tripropionate, tri(methylpropyl) cyclohexane-1,3,5-tripropionate, tri(*n*pentyl) cyclohexane-1,3,5-tripropionate, tri(*iso*pentyl) cyclohexane-1,3,5-tripropionate, tri(2-methylbutyl) cyclohexane-1,3,5-tripropionate, tri(3-methylbutyl) cyclohexane-1,3,5-tripropionate, tri(*n*hexyl) cyclohexane-1,3,5-tripropionate, tri(*iso*hexyl) cyclohexane-1,3,5-tripropionate, tri(*n*heptyl) cyclohexane-1,3,5-tripropionate, tri(*iso*heptyl) cyclohexane-1,3,5-tripropionate, tri(*n*octyl) cyclohexane-1,3,5-tripropionate, tri(*iso*octyl) cyclohexane-1,3,5-tripropionate, tri(2-ethylhexyl) cyclohexane-1,3,5-tripropionate, tri(*n*nonyl) cyclohexane-1,3,5-tripropionate, tri(*iso*nonyl) cyclohexane-1,3,5-tripropionate, tri(*n*decyl) cyclohexane-1,3,5-tripropionate, tri(*iso*decyl) cyclohexane-1,3,5-tripropionate and tri(2-propylheptyl) cyclohexane-1,3,5-tripropionate.