CLAIMS

1. An oral care composition comprising

an orally acceptable vehicle,

metal oxide particles having an average particle size of no greater than a dentin tubule and a polymeric adherent material for adhering the metal oxide particles in the dentin tubule,

wherein the metal oxide comprises at least one metal oxide selected from zinc oxide, stannous oxide, calcium oxide, copper oxide and iron oxide or a mixture thereof, and

wherein the metal oxide is encapsulated in the polymeric adherent material, and

wherein the polymeric adherent material comprises a mixture of two hydroxyalkyl cellulose polymers having different molecular weight,

wherein the two hydroxyalkyl cellulose polymers are selected from the group consisting of hydroxypropylmethyl cellulose (HPMC), hydroxyethylpropyl cellulose (HEPC), hydroxybutylmethyl cellulose (HBMC), and carboxymethyl cellulose (CMC), and

wherein the metal oxide comprises zinc oxide.

2. The oral care composition according to claim 1 wherein the metal oxide particles have a median particle size of 5 microns or less.

3. The oral care composition according to any one of claims 1 and 2 wherein the metal oxide particles have a particle size distribution of 3 to 4 microns, a particle size distribution of 5 to 7 microns, a particle size distribution of 3 to 5 microns, a particle size distribution of 2 to 5 microns, or a particle size distribution of 2 to 4 microns.

4. The oral care composition according to any one of claims 1 to 3 wherein the metal oxide particles are present in an amount of up to 5% by weight, based on the total weight of the oral care composition.

5. The oral care composition according to claim 4 wherein the metal oxide particles are present in an amount of from 0.5 to 2% by weight, being based on the total weight of the oral care composition.

6. The oral care composition according to any one of claims 1 to 5 wherein the metal oxide is incorporated into the oral care composition in at least one form selected from a powder, a nanoparticle solution or suspension, or encapsulated in a polymer or bead.

7. The oral care composition according to any one of claims 1 to 6 wherein the polymeric adherent material comprises at least one polymer selected from poly (ethylene oxide) polymers, linear polyvinylpyrrolidone (PVP) and cross-linked polyvinylpyrrolidone (PVP), polyethylene glycol (PEG)/ polypropylene glycol (PPG) copolymer, ethylene oxide (EO) - propylene oxide (PO) block copolymers, ester gum, shellac, pressure sensitive silicone adhesives, methacrylates, or mixtures thereof.

8. The oral care composition according to any one of claims 1 to 7 further comprising silica particles which have an average particle size of no greater than a dentin tubule.

9. The oral care composition according to claim 8 wherein the silica particles have a median particle size of 8 microns or less.

10. The oral care composition according to claim 9 wherein the silica particles have a median particle size of 2 to 5 microns.

11. The oral care composition according to any one of claims 8 to 10 wherein the silica particles are present in an amount of up to 10% by weight, based on the total weight of the oral care composition.

12. The oral care composition according to claim 11 wherein the silica particles are present in an amount of from 3 to 6% by weight, based on the total weight of the oral care composition.

13. The oral care composition according to any one of claims 1 to 12 which is a dentifrice composition.

14. The oral care composition according to claim 13, which is a toothpaste or a gel.

15. The oral care composition according to any one of claims 1 to 12, wherein the composition is formulated into a form selected from a mouth rinse, a gum, a dissolvable lozenge, and a dissolvable film.

16. An oral care composition according to any one of claims 1 to 15 for use in a method of reducing dental sensitivity.

17. An oral care composition according to any one of claims 1 to 15 for use in a method of protecting dental surfaces from acid-mediated degradation.

18. An oral care composition according to any one of claims 1 to 15 for use in a method of maintaining or increasing the systemic health of a mammal.

19. An oral care composition according to any one of claims 1 to 15 for use in a method of occluding a dentin tubule within the surface of a mammalian tooth.

REPLACEMENT SHEET Attorney Docket No. 8926-00-WO-OC

CLAIMS

1. An oral care composition comprising an orally acceptable vehicle, metal oxide particles having an average particle size of no greater than a dentin tubule and a polymeric adherent material for adhering the metal oxide particles in the dentin tubule, wherein the metal oxide comprises at least one metal oxide selected from zinc oxide, stannous oxide, calcium oxide, copper oxide and iron oxide or a mixture thereof, and wherein the metal oxide is encapsulated in the polymeric adherent material.

2. The oral care composition according to claim 1 wherein the metal oxide particles have a median particle size of 5 microns or less.

3. The oral care composition according to claim 1 wherein the metal oxide comprises zinc oxide.

4. The oral care composition according to any one of claims 1 to 3 wherein the metal oxide particles have a particle size distribution of 3 to 4 microns, a particle size distribution of 5 to 7 microns, a particle size distribution of 3 to 5 microns, a particle size distribution of 2 to 5 microns, or a particle size distribution of 2 to 4 microns.

5. The oral care composition according to any one of claims 1 to 4 wherein the metal oxide particles are present in an amount of up to 5% by weight, based on the total weight of the oral care composition.

6. The oral care composition according to claim 5 wherein the metal oxide particles are present in an amount of from 0.5 to 2% by weight, being based on the total weight of the oral care composition.

7. The oral care composition according to any one of claims 1 to 6 wherein the metal oxide is incorporated into the oral care composition in at least one form selected from a powder, a nanoparticle solution or suspension, or encapsulated in a polymer or bead

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8. The oral care composition according to any one of claims 1 to 7 wherein the polymeric adherent material comprises at least one cellulose polymer.

9. The oral care composition according to claim 8 wherein the at least one cellulose polymer is one or more hydroxyalkyl cellulose polymer selected from hydroxypropylmethyl cellulose (HPMC), hydroxyethylpropyl cellulose (HEPC), hydroxybutylmethyl cellulose (HBMC), and carboxymethyl cellulose (CMC).

10. The oral care composition according to claim 9 wherein the polymeric adherent material comprises a mixture of two hydroxyalkyl cellulose polymers having different molecular weight and the metal oxide comprises zinc oxide which is encapsulated in the mixture of two hydroxyalkyl cellulose polymers.

11. The oral care composition according to any one of claims 1 to 10 wherein the polymeric adherent material comprises at least one polymer selected from include poly (ethylene oxide) polymers, linear polyvinylpyrrolidone (PVP) and cross-linked polyvinylpyrrolidone (PVP), polyethylene glycol (PEG)/ polypropylene glycol (PPG) copolymer, ethylene oxide (EO) - propylene oxide (PO) block copolymers, ester gum, shellac, pressure sensitive silicone adhesives, methacrylates, or mixtures thereof.

12. The oral care composition according to any one of claims 1 to 11 further comprising silica particles which have an average particle size of no greater than a dentin tubule.

13. The oral care composition according to claim 12 wherein the silica particles have a median particle size of 8 microns or less

14. The oral care composition according to claim 13 wherein the silica particles have a median particle size of 2 to 8 microns.

15. The oral care composition according to any one of claims 12 to 14 wherein the silica particles are present in an amount of up to 10% by weight, based on the total weight of the oral care composition.

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16. The oral care composition according to claim 14 wherein the silica particles are present in an amount of from 3 to 6% by weight, based on the total weight of the oral care composition.

17. The oral care composition according to any one of claims 1 to 16 which is a dentifrice composition.

18. The oral care composition according to claim 17, which is a toothpaste or a gel.

19. The oral care composition according to any one of claims 1 to 16, wherein the composition is formulated into a form selected from a mouth rinse, a gum, a dissolvable lozenge, and a dissolvable film.

20. A method of reducing dental sensitivity comprising applying to the surface of a mammalian tooth an oral care composition of any one of claims 1 to 19.

21. A method of protecting dental surfaces from acid-mediated degradation, comprising applying to the surface of a mammalian tooth an oral care composition of any one of claims 1 to 19.

22. A method of maintaining or increasing the systemic health of a mammal comprising applying a composition to an oral surface of a mammal at least once a day for a duration of time, wherein the composition comprises:
a. an oral care composition of any one of claims 1 to 19 , and
b. an agent selected from triclosan; triclosan monophosphate; chlorhexidine; alexidine; hexetidine; sanguinarine; benzalkonium chloride; salicylanilide; domiphen bromide; cetylpyridinium chloride (CPC); tetradecylpyridinium chloride (TPC); N-tetradecyl-4ethylpyridinium chloride (TDEPC), octenidine; delmopinol; octapinol; nisin; zinc ion agent; copper ion agent; essential oils; furanones; bacteriocins, ethyllauroyl arginate, extracts of magnolia, a metal ion source, fluoride, stannous ions, arginine bicarbonate, honokiol, magonol, ursolic acid, ursic acid, morin, extract of sea buckthorn, a peroxide, an

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enzyme, a Camellia extract, a flavonoid, a flavan, halogenated diphenyl ether, creatine, and propolis.

23. A method of occluding a dentin tubule within the surface of a mammalian tooth comprising applying to the tooth surface a composition according to any one of claims 1 to 19.

24. An oral care composition according to any one of claims 1 to 19 for use in a method of reducing dental sensitivity.

25. An oral care composition according to any one of claims 1 to 19 for use in a method of protecting dental surfaces from acid-mediated degradation.

26 An oral care composition according to any one of claims 1 to 19 for use in a method of maintaining or increasing the systemic health of a mammal.

27. An oral care composition according to any one of claims 1 to 19 for use in a method of occluding a dentin tubule within the surface of a mammalian tooth.