

Claims

1. A composite comprising an inorganic metal or alloy core at least partially covered by a protection layer comprising a carboxylate salt, a metal oxide, a metal oxide salt or a metal-amino acid complex.
- 5 2. The composite of claim 1, wherein said core comprises a metal selected from the group consisting of Group 2, Group 4, Group 7, Group 8, Group 12 or Group 13 of the Periodic Table of Elements, combinations thereof and alloys thereof.
- 10 3. The composite of claim 1 or 2, wherein said metal is selected from the group consisting of zinc, iron, aluminium, titanium, magnesium, and manganese.
4. The composite of any one of claims 1 to 3, wherein said acid is selected from the group consisting of organic acids, inorganic acids, and mixtures thereof.
- 15 5. The composite of claim 4, wherein said organic acid is selected from the group consisting of carboxylic acids, amino acids, and mixtures thereof.
- 20 6. The composite of claim 5, wherein said carboxylic acid is a saturated monocarboxylic acid of the formula $\text{CH}_3(\text{CH}_2)_n\text{COOH}$, wherein n is an integer from 0 to 20.
7. The composite of claim 5, wherein said carboxylic acid is selected from the group consisting of saturated fatty acids, unsaturated fatty acids, aromatic carboxylic acids, dicarboxylic acids, tricarboxylic acids, keto acids, α -hydroxyl acids and divinylether fatty acids.
- 25 8. The composite of claim 5, wherein said amino acid is selected from the group consisting of proteinogenic amino acids, non-proteinogenic amino acids, and mixtures thereof.
9. The composite of claim 4, wherein said inorganic acid is selected from the group consisting of phosphoric acid, polyphosphoric acids, tungstic acids, vanadic acid, molybdic acid, and heteropolyacids.
- 30 10. The composite of any of claims 1 to 9, wherein said protection layer is polymeric or non-polymeric.
- 35 11. The composite of any one of claims 1 to 10, wherein said protection layer is porous or non-porous.
12. The composite of any one of claims 1 to 11, wherein said inorganic metal or alloy core is of a size in the range of 0.01 μm to 100 μm or said protection layer is of a thickness in the range of 5 nm to 1,000 nm.
- 40 13. The composite of any one of claims 1 to 12, wherein said protection layer is in a mass weight percentage range of 0.1 % to 20 % by weight of the inorganic core.
- 45 14. The composite of any one of claims 1 to 13, wherein said composite is in the size range of 100 nm to 500,000 nm.
15. A method of preparing the composite comprising an inorganic metal or alloy core at least partially covered by a protection layer comprising a carboxylate salt, a metal oxide, a metal oxide salt or a metal-amino acid complex, comprising the step of mixing a metal or alloy with an acid, at elevated temperature for a time duration, optionally in the presence of a solvent.
- 50 16. The method according to claim 15, wherein said elevated temperature is in the range of 50 °C to 180 °C, or wherein said time duration is in the range of 1 hour to 50 hours.

17. Use of a composite as an antimicrobial agent, wherein said composite comprises an inorganic metal or alloy core at least partially covered by a protection layer comprising a carboxylate salt, a metal oxide, a metal oxide salt or a metal-amino acid complex.
- 5 18. A composite for use in the treatment or prophylaxis of microbial infection, wherein said composite comprises an inorganic metal or alloy core at least partially covered by a protection layer comprising a carboxylate salt, a metal oxide, a metal oxide salt or a metal-amino acid complex.
- 10 19. Use of a composite in the manufacture of a medicament for the treatment or prophylaxis of microbial infection, wherein said composite comprises an inorganic metal or alloy core at least partially covered by a protection layer comprising a carboxylate salt, a metal oxide, a metal oxide salt or a metal-amino acid complex.
- 15 20. A method of inhibiting microbial activity or treating a microbial infection or disease comprising administering an antimicrobial composition comprising said composite of claim 1 to a subject or applying the antimicrobial composition on a surface.