Claims

1. An antibacterial composition comprising: nanostructures of a Group (II) metal oxide-hydroxide composite.

2. The composition according to claim 1, wherein the composition is applied to a support.

3. The composition according to claim 2, wherein the support comprises a network of fibres, and/or wherein the support comprises reticulated foam.

4. The composition according to claim 2 or 3, wherein the nanostructures are attached to the support.

5. The composition according to any of claims 2-4, wherein the nanostructures comprise a plurality of arms, wherein adjacent arms have interstitial spaces extending therebetween, and/or wherein the plurality of arms comprise at least one petaloid member.

6. The composition according to claim 5, wherein an average distance of the interstitial spaces between adjacent arms is 90-200 nm, and/or wherein the plurality of arms have an average thickness of 10-60 nm.

7. The composition according to any preceding claim, wherein the nanostructures comprise nanoflowers.

8. The composition according to any preceding claim, wherein the Group (II) metal is magnesium, calcium, or a combination thereof.

9. The composition according to any preceding claim, wherein 2-hour bactericidal efficacy is > 50% for Gram-positive and Gram-negative bacteria, and/or wherein 24-hour bactericidal efficacy is > 99% for Gram-positive and Gram-negative bacteria.

10. A method of forming an antibacterial composition according to any of claims 1-9, comprising:

- mixing a Group (II) metal hydroxide solution and a polymeric solution to form a mixed solution;
- forming nanofiber layers from the mixed solution;
- calcining the nanofiber layers;
- forming particles from the calcined nanofiber layers; and
- steaming the particles to form the composition.

11. The method according to claim 10, wherein the forming nanofiber layers comprises electrospinning, and/or wherein the steaming is for 10-50 minutes.

12. The method according to claim 10 or 11, further comprising applying the composition to a support.

13. The method according to claim 12, further comprising pre-treating the support prior to the applying.

14. The method according to claim 13, wherein the pre-treating comprises contacting the support with an acid and a polysaccharide.

15. The method according to any of claims 10-14, further comprising drying the nanofiber layers prior to the calcining, and/or drying the particles after the steaming.