

Claims

1. A bone cement composition comprising:
 - a powder component comprising at least one acrylic polymer;
 - a liquid component comprising a monomer;
 - 5 - an antibiotic; and
 - an acid-functionalised polymer,wherein reaction of the powder component and the liquid component results in formation of a bone cement.
- 10 2. The bone cement composition according to claim 1, wherein the acid-functionalised polymer is an acid-functionalised copolymer.
3. The bone cement composition according to claim 1 or 2, wherein the acid-functionalised polymer is an acid-functionalised block copolymer comprising at least
15 two homopolymer subunits.
4. The bone cement composition according to claim 3, wherein one of the at least two homopolymer subunits is polycarbonate (PAC).
- 20 5. The bone cement composition according to claim 3 or 4, wherein the acid-functionalised block copolymer is an acid-functionalised diblock copolymer.
6. The bone cement composition according to any preceding claim, wherein the acid-functionalised polymer is: polyethylene glycol-polycarbonate (PEG-PAC),
25 polycarbonate-poly(L-lactide) (PAC-PLLA), polycarbonate-poly(D-lactide) (PAC-PDLA), PAC-PLLA/PDLA, copolymers thereof or a combination thereof.
7. The bone cement composition according to any preceding claim, wherein the composition comprises 0.5-15 wt. % of acid-functionalised polymer, based on total
30 weight of the composition.
8. The bone cement composition according to any preceding claim, wherein the antibiotic is an amine-containing antibiotic.

9. The bone cement composition according to any preceding claim, wherein the antibiotic is an aminoglycoside antibiotic.

10. The bone cement composition according to claim 9, wherein the
5 aminoglycoside antibiotic is: amikacin, apramycin, geneticin, gentamicin, kanamycin, netilmicin, neomycin, paromomycin, spectinomycin, streptomycin, tobramycin, polymyxins, or a combination thereof.

11. A bone cement formed from the bone cement composition of any of the
10 preceding claims.

12. The bone cement according to claim 11, wherein amine group comprised in the antibiotic and carboxylic group comprised in the acid-functionalised polymer form a non-covalent bond.

15

13. The bone cement according to claim 11 or 12, wherein the bone cement exhibits antibacterial activity for ≥ 100 days.

14. The bone cement according to any of claims 11 to 13, wherein the bone cement
20 exhibits an area of inhibition zone for bacteria of $\geq 1 \text{ cm}^2$ after 100 days.

15. The bone cement according to any of claims 11 to 14, wherein the bone cement has a compressive modulus of $\geq 875 \text{ MPa}$.

25 16. A kit for forming a bone cement, the kit comprising;
- a powder component comprising at least one acrylic polymer;
- a liquid component comprising a monomer;
- an antibiotic; and
- an acid-functionalised polymer.

30 17. The kit according to claim 16, wherein the powder component further comprises a polymerization initiator.

18. The kit according to claim 16 or 17, wherein the liquid component further comprises a polymerization activator.

35