Claims

1. A bone cement composition comprising:
   - a powder component comprising at least one acrylic polymer;
   - a liquid component comprising a monomer;
   - an antibiotic; and
   - an acid-functionalised diblock copolymer,

wherein reaction of the powder component and the liquid component results in formation of a bone cement.

2. The bone cement composition according to claim 1, wherein the acid-functionalised diblock copolymer comprises a polycarbonate (PAC) homopolymer subunit.

3. The bone cement composition according to claim 1 or 2, wherein the acid-functionalised diblock copolymer is: polyethylene glycol-polycarbonate (PEG-PAC), polycarbonate-poly(L-lactide) (PAC-PLLA), polycarbonate-poly(D-lactide) (PAC-PDLA), PAC-PLLA/PDLA, copolymers thereof or a combination thereof.

4. The bone cement composition according to any preceding claim, wherein the composition comprises 0.5-15 wt. % of acid-functionalised diblock copolymer, based on total weight of the composition.

5. The bone cement composition according to any preceding claim, wherein the antibiotic is an amine-containing antibiotic.

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

7. The bone cement composition according to claim 6, wherein the aminoglycoside antibiotic is: amikacin, apramycin, geneticin, gentamicin, kanamycin, netilmicin, neomycin, paromomycin, spectinomycin, streptomycin, tobramycin, polymyxins, or a combination thereof.

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

9. The bone cement according to claim 8, wherein amine group comprised in the antibiotic and carboxylic group comprised in the acid-functionalised diblock copolymer form a non-covalent bond.

10. The bone cement according to claim 8 or 9, wherein the bone cement exhibits antibacterial activity for ≥ 100 days.

11. The bone cement according to any of claims 8 to 10, wherein the bone cement exhibits an area of inhibition zone for bacteria of ≥ 1 cm^2 after 100 days.

12. The bone cement according to any of claims 8 to 11, wherein the bone cement has a compressive modulus of ≥ 875 MPa.

13. 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 diblock copolymer.

14. The kit according to claim 13, wherein the powder component further comprises a polymerization initiator.

15. The kit according to claim 13 or 14, wherein the liquid component further comprises a polymerization activator.