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 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 two homopolymer subunits.~~

~~4.~~2. The bone cement composition according to claim ~~3~~1, wherein ~~one of the at least two homopolymer subunits is~~ the acid-functionalised diblock copolymer comprises a polycarbonate (PAC) homopolymer subunit.

~~5. The bone cement composition according to claim 3 or 4, wherein the acid-functionalised block copolymer is an acid-functionalised diblock copolymer.~~

~~6.~~3. The bone cement composition according to ~~any preceding~~ 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.

~~7.~~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.

~~8.~~5. The bone cement composition according to any preceding claim, wherein the antibiotic is an amine-containing antibiotic.

~~9.~~6. The bone cement composition according to any preceding claim, wherein the antibiotic is an aminoglycoside antibiotic.

~~10.~~7. The bone cement composition according to claim ~~9~~6, wherein the aminoglycoside antibiotic is: amikacin, apramycin, geneticin, gentamicin, kanamycin, netilmicin, neomycin, paromomycin, spectinomycin, streptomycin, tobramycin, polymyxins, or a combination thereof.

~~11.~~8. A bone cement formed from the bone cement composition of any of the preceding claims.

~~12.~~9. The bone cement according to claim ~~11~~8, wherein amine group comprised in the antibiotic and carboxylic group comprised in the acid-functionalised diblock copolymer form a non-covalent bond.

~~13.~~10. The bone cement according to claim ~~11 or 12~~ 8 or 9, wherein the bone cement exhibits antibacterial activity for ≥ 100 days.

~~14.~~11. The bone cement according to any of claims ~~11 to 13~~ 8 to 10, wherein the bone cement exhibits an area of inhibition zone for bacteria of ≥ 1 cm^2 after 100 days.

~~15.~~12. The bone cement according to any of claims ~~11 to 14~~ 8 to 11, wherein the bone cement has a compressive modulus of ≥ 875 MPa.

~~16.~~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.

~~17.~~14. The kit according to claim ~~16~~ 13, wherein the powder component further comprises a polymerization initiator.

~~18.~~15. The kit according to claim ~~16 or 17~~ 13 or 14, wherein the liquid component further comprises a polymerization activator.