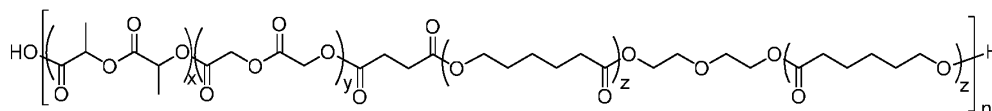


Claims

What is claimed is:

1. A bioresorbable polymer of Formula A

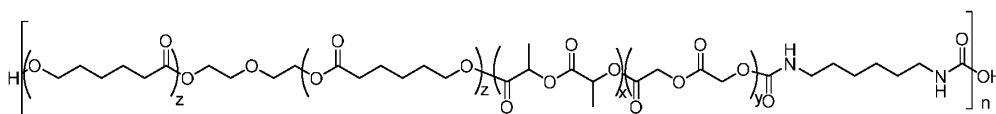


(Formula A)

wherein:

- x is between 0 and 2,000;
- y is between 0 and 2,000;
- x plus y is between 2 and 2000;
- z is between 2 and 2,000; and
- n is between 1 and 1,000.

2. A bioresorbable polymer of Formula B



(Formula B)

wherein:

- x is between 0 and 2,000;
- y is between 0 and 2,000;
- x plus y is between 2 and 2000;
- z is between 2 and 2,000; and
- n is between 1 and 1,000.

3. The bioresorbable polymer of claim 1 or 2, wherein the shape of the bioresorbable polymer changes in a temperature range of -60 to 60°C.
4. A composition comprising:

a bioresorbable polymer of Formula A of claim 1 or 3, or of Formula B of claim 2 or 3, or a mixture thereof.

5. The composition of claim 4, wherein the composition further comprises an additive, wherein the additive is an antimicrobial agent, an antibacterial agent, a growth factor, a vitamin, a biologic, an antibiotic, an antiviral agent, antifungal agent, alendronate, olpadronate, etidronate, colecalciferol, tocopherol, pyridoxin, cobalamine platelet-derived growth factor, glycine, lysine, penicillin, cephalosporin, lamivudine, tetracycline, and zidovudine, polyethylene glycol, a polyamino acid, an aliphatic polyester, a saccharide, a polysaccharide, an aliphatic polycarbonate, a poly amine, a polyanhydride, a steroid, glycerol, ascorbic acid, an amino acid, or a peptide, an inorganic particle, poly-L-lysine, poly-D-lysine, poly-D,L-lysine, poly-L-cysteine, poly-D-cysteine, poly-D,L-cysteine, short oligomers of L-lysine, D-lysine, L-cysteine, D-cysteine, an amino functionalized PEG, an amino functionalized inorganic particle, a tin catalyst, or a mixture thereof.
6. A process for preparing a bioresorbable polymer of Formula A of claim 1 or 3 or a bioresorbable polymer of Formula B of claim 2 or 3 comprising the steps of mixing a polymer backbone with a functional group precursor to form a mixture; and adding a linker to the mixture to form the bioresorbable polymer.
7. A vascular closure device comprising a composition of claim 4 or 5.
8. A stent comprising a composition of claim 4 or 5.
9. A mastectomy device comprising a composition of claim 4 or 5.
10. A 3D printed part comprising a composition of claims 4 or 5.
11. A process for producing a 3D printed part containing a polymer of any of claims 1 to 3 or the composition of claim 4 or 5 using a solution based 3D printing machine; the process comprising:
 - (a) providing the bioresorbable polymer of Formula A of claim 1 or 3, Formula B of claim 2 or 3, or a mixture thereof or the composition of claim 4 or 5;

- (b) adding the bioresorbable polymer of Formula A, Formula B , or a mixture thereof or the composition to a solvent to form a polymer solution;
 - (c) printing the polymer solution through a print head to form the 3D printed part by depositing sequential layers onto the build stage of the printer.
12. A process for producing a 3D printed part containing a bioresorbable polymer of any of claims 1 to 3 or the composition of claim 4 or 5 using an extrusion based 3D printing machine, wherein the process comprises printing the polymer or mixture thereof or the composition through a print head to form the 3D printed part, and depositing sequential layers onto the build stage of the printer.
13. A process of producing a 3D printed part using binderjetting, comprising the steps of:
- (a) providing powder of a bioresorbable polymer of any of claims 1 to 3 or the composition of claim 4 or 5;
 - (b) selectively depositing an amount of a binder onto the powder of polymer or the composition to produce an unfinished layer;
 - (c) repeating steps (a) and (b) to produce a three-dimensional unfinished model; and
 - (d) sintering the unfinished model to produce a three-dimensional 3D printed part.
14. The 3D printed part of claim 10 having a functional gradient along the build axis of the part.
15. Use of 3D printed parts of claim 10 as bone fillers, vascular closure device, and hemostasis device, in aneurysms applications, mastectomy application, and stent applications, or as a scaffold for regenerative medicine.