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What is Claimed:

1. A process for preparing a polarized polymeric composition comprising the steps of:
 - a) providing a layer of a polarizable polymeric composition, wherein the polarizable polymeric composition comprises a polyhydroxyalkanoate based copolymer;
 - b) directionally perturbing the layer to induce polarization;
 - c) optionally polarizing the polymeric composition of the directionally perturbed layer by applying a high electric field which is of less intensity than that which would cause substantial dielectric breakdown of the one or more polymers; and
 - d) optionally annealing the polarized polymeric composition of the layer at a temperature less than the melting temperature of the crystals of the polarized polymeric composition, whereby the polarization is retained up to the crystal melting point of the polar crystals of the polymeric composition, wherein the polarized polymeric composition comprises a β -form of the PHA based copolymer, present in an amount of from about 10% to about 99%, as measured by x-ray diffraction.
2. The process of claim 1, wherein the step of providing a layer comprises electrospinning a ribbon of fibers from a solution of the polyhydroxyalkanoate based copolymer in one or more solvents, wherein the each fiber of the electrospun ribbon of fibers comprises a shell formed of β -form and a core formed of α -form.
3. The process of claim 1 wherein the step of providing a layer comprises forming a layer from a solution of the polyhydroxyalkanoate based copolymer in one or more solvents.
4. The process of claim 1 wherein the step of providing a layer comprises forming a layer from a melted composition of the polyhydroxyalkanoate based copolymer.
5. The process of claim 4, wherein the step of directionally perturbing the layer comprises calendar rolling, shearing or cold drawing the layer after quenching.
6. The process of claim 1 wherein the step of providing a layer comprises forming a film from a gel composition of the polyhydroxyalkanoate based copolymer.

7. The process of claim 6, wherein the step of directionally perturbing the film comprises drying gel under shear pressure or freezing gel to induce shear by crystallization of solvent.
8. The process of claim 1 wherein the polyhydroxyalkanoate based
5 copolymer comprises at least one monomer unit selected from the group consisting of hydroxybutyrate units, hydroxyhexanoate units, vinyl units, vinylidene units, ethylene units, acrylate units, methacrylate units, Nylon units, carbonate units, acrylonitrile units, cellulose units, units having pendant fluoro, chloro, amide, ester other than ester of acrylate and methacrylate units,
10 cyanide, nitrile other than of acrylonitrile units, or ether groups, protein units and combinations thereof.
9. The process of claim 1 wherein the polarizable polymeric composition further comprises one or more polymers selected from the group consisting of polyvinylchloride, polymethylacrylate, polymethylmethacrylate, poly(vinylidene
15 cyanide/vinyl acetate) copolymers, vinylidene cyanide/vinyl benzoate copolymers, vinylidene cyanide/isobutylene copolymers, vinylidene cyanide/methyl methacrylate copolymers, vinylidene fluoride copolymer, polyvinylfluoride, polyacrylonitrile, polycarbonate, cellulose, proteins, synthetic polyesters and ethers of cellulose, poly(γ -methyl-L-glutamate), vinylidene
20 copolymers, Nylon-3, Nylon-5, Nylon-7, Nylon-9, Nylon-11 and blends thereof.
10. The process of claim 1 wherein the step optionally polarizing the polymeric composition of the directionally perturbed layer is conducted using an electric field of at least 1 MV/cm at a temperature from about 20° C. to about 120° C. for up to about 5 hours.
- 25 11. The process of claim 1 wherein the layer is annealed at a temperature in the range of from about 125° C. to about 150° C. for at least one hour.
12. A device comprising a PHA based copolymer layer comprising at least one of an electrospun ribbon of fibers of a polyhydroxyalkanoate based copolymer or the polarized polymeric composition obtained by the process of
30 claim 1, wherein the layer is configured to exhibit one or more of a piezoelectric effect, a pyroelectric effect and a ferroelectric effect, wherein each of the electrospun ribbon of fibers and the polarized polymeric composition comprises a β -form of the PHA based copolymer present in an amount of from about 10% to about 99%, as measured by x-ray diffraction.
- 35 13. The polymeric device of claim 12, wherein the device is a sensor configured to produce a potential difference or voltage in response to a change in dimension of the PHA based copolymer layer.

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14. The device of claim 13, wherein the change in dimension is caused by a change in one or more of the following properties, humidity, temperature, salinity, nutrient attachment or infusion and metalloid attachment at a surface of the PHA based copolymer layer.
- 5 15. The device of claim 12, wherein the sensor comprises a plurality of sensor surfaces and/or interfaces, wherein each surface/interface is independently configured to monitor one of the following properties, humidity, temperature, salinity, nutrient attachment or infusion and metalloid attachment.
- 10 16. The device of claim 12, wherein the device is an actuator configured to expand or contract in response to an application of an electrical charge across the PHA based copolymer layer.
17. A nanomotor comprising one or more piezoelectric actuators of claim 16.
18. A device comprising one or more actuators of claim 16 configured for placement or implantation near a vascular system component of an animal or a human patient and configured to produce a change in dimension of the PHA based copolymer layer due to heartbeats of the animal or the human patient to generate a potential difference or voltage to operate a monitoring or treatment device.
- 15 19. The device of claim 18, wherein the treatment or monitoring device comprises a pacemaker, insulin pump, in-situ glucose monitor, or blood pressure monitor.
- 20 20. The device of claim 18, wherein the vascular system component comprises a vein or artery that beats in a cadence corresponding to heart beats of the patient.
- 25 21. A method comprising:
providing a PHA based copolymer sensor layer configured to monitor one of the following properties, humidity, temperature, salinity, nutrient attachment or infusion and metalloid attachment, wherein the PHA based copolymer sensor layer comprises at least one of an electrospun ribbon of fibers of a polyhydroxyalkanoate based copolymer or the polarized polymeric composition obtained by the process of claim 1;
30 exposing a PHA based copolymer sensor layer to one or more of the said properties, such that the PHA based copolymer sensor layer undergo a change in dimension caused by a change in one or more of the said properties, and
35 detecting a potential difference or voltage in response to a change in dimension of the PHA based copolymer sensor layer.