CLAIMS

1. A medical implant comprising a biocomposite, said biocomposite comprising a polymer and a plurality of reinforcement fibers, wherein a weight percentage of a mineral composition within the biocomposite medical implant is in a range of 30-60%, wherein an average diameter of said fibers is in a range of 1-100 microns, said medical implant being threaded with a plurality of threads; wherein said fibers comprise a plurality of helical fibers and a plurality of longitudinal fibers; wherein a weight percentage to weight percentage ratio of said helical to said longitudinal fibers is from 90:10 to 10:90.

2. The implant of claim 1, wherein a winding angle of said helical layers is in a range of from 5 to 60 degrees or from 20 degrees to 45 degrees.

3. The implant of claim 1 wherein the implant threads are of a constant pitch or of a variable pitch.

4. The implant of claim 1, wherein said biocomposite is arranged in a plurality of layers, wherein fibers in each layer are discontinuous to an adjacent layer.

5. The implant of claim 4, wherein helical fibers in a first layer are wound clockwise while helical fibers in an adjacent layer are wound counterclockwise.

6. The implant of claim 5, wherein a winding angle of said helical fibers is wound toward an area of greater torsional stress of the implant.

7. The implant of claim 4, further comprising a plurality of helical layers and a plurality of longitudinal layers, wherein said helical and longitudinal layers are each grouped into discrete regions of wall thickness of the implant such that they form concentric regions in the implant.

8. The implant of claim 7, wherein a number of helical layers is in a range of from 1 to 15, preferably in the range of 1 to 10, more preferably in the range of 4 to 6, or optionally in the range of 8 to 15; optionally wherein a diameter of the threaded implant is in the range of 2 to 4mm and the number of helical layers is in the range of 2-12, preferably 3-8; and optionally wherein a number of longitudinal layers is in a range of from 1 to 15, preferably in the range of 1 to 10, more preferably in the range of 4-6, or optionally in the range of 1-5.

9. The implant of claim 1, further comprising at least one layer of a plurality of layers comprising a plurality of continuous fibers along said layer, and at least one other layer comprising a plurality of chopped fibers, wherein a length of said chopped fibers is less than a length of said at least one other layer; optionally wherein an average length of the chopped fibers is <10% of the length of the implant and preferably <5% of the length of the implant; and optionally wherein said chopped fibers are located at said plurality of threads for reinforcement.

10. The implant of claim 1, wherein the plurality of threads form a single set of threads.

11. The implant of claim 1, comprising multiple sets of threads.

12. The implant of claim 1, comprising threads having a fixed lead or progressive lead.

13. The implant of claim 1, comprising threads having a fixed pitch or progressive pitch.

14. The implant of claim 1, wherein threading is not continuous throughout the circumference.

15. The implant of claim 1, wherein said plurality of threads comprise a shape selected from the group consisting of V thread, buttress, reverse buttress, spiral, combination of buttress and reverse, trapezoidal, square or a combination thereof.

16. The implant of claim 1, wherein an average depth of the threads is in the range of 0.2-4mm.

17. The implant of claim 1, further comprising one or more longitudinal grooves breaking in the threads; optionally wherein said one or more longitudinal grooves span an entire length of the plurality of threads; and optionally wherein said one or more longitudinal grooves span up to 80% of an entire length of the plurality of threads.

18. The implant of claim 1, wherein said mineral composition is silica-based.

19. The implant of claim 1, wherein density of the biocomposite composition is between 0.5 to 4 g/cm^3, between 1 to 3 g/cm^3, or between 1.3- 2.5 g/cm^3.

20. The implant of claim 1, wherein mineral content is provided by a reinforcing mineral fiber made from the mineral composition;
optionally wherein said fibers are embedded in a polymer matrix comprising said biocomposite; and
optionally wherein said polymer comprises lactide, glycolide, caprolactone, valerolactone, carbonates (e.g., trimethylene carbonate, tetramethylene carbonate, and the like), dioxanones (e.g., 1,4-dioxanone), δ-valerolactone, 1,dioxepanones (e.g., 1,4-dioxepan-2-one and 1,5-dioxepan-2-one), ethylene glycol, ethylene oxide, esteramides, γ-ydroxyvalerate, β-hydroxypropionate, alpha-hydroxy acid, hydroxybuterates, poly (ortho esters), hydroxy alkanoates, tyrosine carbonates, polyimide carbonates, polyimino carbonates such as poly (bisphenol A-iminocarbonate) and poly (hydroquinone-iminocarbonate,(polyurethanes, polyanhydrides, polymer drugs (e.g., polydiflunisol, polyaspirin, and protein therapeutics), sugars; starch, cellulose and cellulose derivatives, polysaccharides, collagen, chitosan, fibrin, hyaluronic acid, polypeptides, proteins, poly (amino acids), polylactides (PLA), poly-L-lactide (PLLA), poly-DL-lactide (PDLLA); polyglycolide (PGA); copolymers of glycolide, glycolide/trimethylene carbonate

copolymers (PGA/TMC); other copolymers of PLA, such as lactide/tetramethylglycolide copolymers, lactide/trimethylene carbonate copolymers, lactide/d-valerolactone copolymers, lactide/ε-caprolactone copolymers, L-lactide/DL-lactide copolymers, glycolide/L-lactide copolymers (PGA/PLLA), polylactide-co-glycolide; terpolymers of PLA, such as lactide/glycolide/trimethylene carbonate terpolymers, lactide/glycolide/ ε -caprolactone terpolymers, PLA/polyethylene oxide copolymers; polydepsipeptides; unsymmetrically – 3,6-substituted poly-1 ,4-dioxane-2,5-diones; polyhydroxyalkanoates; such as polyhydroxybutyrates (PHB); PHB/b-hydroxyvalerate copolymers (PHB/PHV); poly-b-hydroxypropionate (PHPA); poly-p-dioxanone (PDS); poly-d-valerolactone - poly-ε-capralactone, poly(ε-caprolactone-DL-lactide) copolymers; methylmethacrylate-N-vinyl pyrrolidone copolymers; polyesteramides; polyesters of oxalic acid; polydihydropyrans; polyalkyl-2-cyanoacrylates; polyurethanes (PU); polyvinylalcohol (PVA); polypeptides; poly-b-malic acid (PMLA): poly-b-alkanbic acids; polycarbonates; polyorthoesters; polyphosphates; poly(ester anhydrides); and mixtures thereof; and derivatives, copolymers and mixtures thereof.