CLAIMS

1. A composition comprising:

(i) a particle that comprises:

(a) a shell comprising a shell polymer that is bioabsorbable and biodegradable, wherein the shell polymer comprises polycaprolectone (PCL), poly D-lactic acid (PDLA), poly L-lactic acid (PLLA), poly(lactic-co-glycolic acid), (PLGA), polyethylene glycol (PEG), polyethylene glycol - diacrylate (PEGDA), poly(sebacic anhydride) (poly(SA)), polyorthoester, aliphatic polyanhydride, aromatic polyanhydride, or a block copolymer thereof; and

(b) a core comprising a coloring agent having a molecular weight of about 5 to about $10x10^6$ Daltons; and

(ii) a carrier solution;

wherein the particle is present in the carrier solution at a concentration of about 400 mg/ml to about 800 mg/ml.

2. The composition of claim 1, wherein the composition is useful as a semi-permanent tattoo ink.

3. The composition of claim 1, wherein the particle has an average diameter ranging from about 100 μm to about 10 nm.

4. The composition of claim 1, wherein the particle has an average diameter ranging from about 10 μm to about 10 nm.

5. The composition of claim 1, wherein the shell polymer has a weight average molecular weight between 50 Da to 200 kDa, inclusive.

6. The composition of claim 1, wherein the shell polymer undergoes surface or bulk erosion in aqueous solution.

7. The composition of claim 1, having a bioabsorption profile or a biodegradation profile that exhibits a lag phase of about 2 months to about 12 months.

8. The composition of claim 1, wherein the coloring agent is a dye, is a pigment, is fluorescent, or is phosphorescent.

9. The composition of claim 1, wherein the core further comprises a core polymer.

10. The composition of claim 9, wherein the shell polymer and the core polymer are the same.

11. The composition of claim 9, wherein the shell polymer and the core polymer are different.

12. The composition of claim 9, wherein at least one of the shell polymer and the core polymer is a block copolymer, and wherein the block copolymer is a diblock copolymer or a triblock copolymer.

13. The composition of claim 9, wherein the core polymer is present in the particle at a concentration of about 7%-10%, about 10%-15%, about 15%-20%, about 20%- 25%, about 25%-30%, about 30%-35%, about 35%-40%, about 40%-45%, about 45%- 50%, about 50%-55%, about 55%-60%, about 60%-65%, about 65%-70%, about 70%- 75%, about 75%-80%, about 80%-85%, about 85%-90%, or about 90%-92% w/w.

14. The composition of claim 9, wherein the coloring agent is adsorbed to, physically entrapped by, or covalently bonded to the core polymer.

15. The composition of claim 1, wherein the coloring agent is adsorbed to, physically entrapped by, or covalently bonded to the shell polymer.

16. The composition of claim 1, wherein the shell polymer comprises an aliphatic polyanhydride or an aromatic polyanhydride, wherein the aliphatic polyanhydride or the aromatic polyanhydride is poly[bis(p- carboxyphenoxy)methane)] (poly(CPM)), poly[l,3-bis(p-carboxyphenoxy)propane)] poly(CPP), poly[l,6-bis(p-carboxyphenoxy)hexane] (poly(CPH)), poly(sebacic anhydride) (poly(SA)), poly[l,4-bis(hydroxyethyl)terephthalate-

alt-ethyloxyphosphate], or poly[l,4- bis(hydroxyethyl)terephthalate-alt-ethyloxyphosphate]-co-1,4- bis(hydroxyethyl)terephthalate-co-terephthalate (P(BHET-EOP/BHET), 80/20).

17. The composition of claim 1, wherein the shell polymer comprises a polyorthoester, wherein the polyorthoester (POE) is POE I, POE II, POE III, or POE IV.

18. The composition of claim 9, wherein the core polymer is bioabsorbable and biodegradable, wherein the core polymer comprises polycaprolectone (PCL), poly D-lactic acid (PDLA), poly L-lactic acid (PLLA), poly(lactic-co-glycolic acid), (PLGA), polyethylene glycol (PEG), polyethylene glycol - diacrylate (PEGDA), poly(sebacic anhydride) (poly(SA)), polyorthoester, aliphatic polyanhydride, aromatic polyanhydride, or a block copolymer thereof.

19. The composition of claim 9, wherein the core polymer is bioabsorbable and biodegradable, wherein the core polymer comprises an aliphatic polyanhydride or an aromatic polyanhydride, wherein the aliphatic polyanhydride or the aromatic polyanhydride is poly[bis(p- carboxyphenoxy)methane)] (poly(CPM)), poly[l,3-bis(p-carboxyphenoxy)propane)] poly(CPP), poly[l,6-bis(p-carboxyphenoxy)hexane] (poly(CPH)), poly(sebacic anhydride) (poly(SA)), poly[l,4-bis(hydroxyethyl)terephthalate-alt-ethyloxyphosphate], or poly[l,4- bis(hydroxyethyl)terephthalate-alt-ethyloxyphosphate]-co-1,4- bis(hydroxyethyl)terephthalate-co-terephthalate (P(BHET-EOP/BHET), 80/20).

20. The composition of claim 9, wherein the shell polymer comprises a polyorthoester, wherein the polyorthoester (POE) is POE I, POE II, POE III, or POE IV.

21. The composition of claim 1, wherein the particle is present in the carrier solution at a concentration of from about 400 mg/ml to about 430 mg/ml, from about 430 mg/ml to about 450 mg/ml, from about 450 mg/ml to about 480 mg/ml, from about 480 mg/ml to about 510 mg/ml, about 510 mg/ml to about 540 mg/ml, about 540 mg/ml to about 570 mg/ml, or about 570 mg/ml to about 600 mg/ml.

22. The composition of claim 1, further comprising a humectant.

23. The composition of claim 1, further comprising a buffer.

24. The composition of claim 1, further comprising a surfactant.

25. The composition of claim 1, wherein the carrier solution comprises sterile saline, phosphate buffered saline, water, ethanol, polyol, or oil, or a mixture thereof.

26. A method of tattooing a subject, comprising intradermally administering to the subject a cosmetically effective amount of the composition of claim 1.

27. A method of tattooing a subject, comprising intradermally administering to the subject a cosmetically effective amount of the composition of claim 9.

28. A method of treating a pigment disorder, comprising contacting skin of a subject in need thereof with an effective amount of the composition of claim 1.

29. A method of treating a pigment disorder, comprising contacting skin of a subject in need thereof with an effective amount of the composition of claim 9.

30. A composition comprising:
(i) a particle and (ii) a carrier solution, wherein:

the particle comprises:

(a) a polymer that is bioabsorbable and biodegradable, wherein the polymer comprises polycaprolectone (PCL), poly D-lactic acid (PDLA), poly L-lactic acid (PLLA), poly(lactic-co-glycolic acid), (PLGA), polyethylene glycol (PEG), polyethylene glycol - diacrylate (PEGDA), poly(sebacic anhydride) (poly(SA)), poly orthoester, aliphatic polyanhydride, aromatic polyanhydride, or a block copolymer thereof; and

(b) a coloring agent having a molecular weight of about 5 to about $10x10^6$ Daltons;

wherein the particle is present in the carrier solution at a concentration of about 400 mg/ml to about 800 mg/ml.

31. The composition of claim 30, wherein the composition is useful as a semi-permanent tattoo ink.

32. The composition of claim 30, wherein the particle is present in the carrier solution at a concentration of about 480 mg/ml to about 600 mg/ml.

33. The composition of claim 30, wherein the particle has an average diameter ranging from about 10 μm to about 10 nm.

34. The composition of claim 30, wherein the particle does not comprise a metal.

35. The composition of claim 30, wherein the coloring agent is adsorbed to, physically entrapped by, or covalently bonded to the polymer.

36. The composition of claim 30, further comprising a humectant.

37. The composition of claim 30, further comprising a buffer.

38. The composition of claim 30, further comprising a surfactant.

39. The composition of claim 30, wherein the carrier solution comprises sterile saline, phosphate buffered saline, water, ethanol, polyol, or oil, or a mixture thereof.

40. The composition of claim 30, having a bioabsorption profile or a biodegradation profile that exhibits a lag phase of about 2 months to about 12 months.

41. The composition of claim 30, wherein the coloring agent is a dye, is a pigment, is fluorescent, or is phosphorescent.

42. A method of tattooing a subject, comprising intradermally administering to the subject a cosmetically effective amount of the composition of claim 30.

43. A method of treating a pigment disorder, comprising contacting skin of a subject in need thereof with an effective amount of the composition of claim 30.

44. The method of claim 26, wherein the tattooing provides a tattoo that partially or fully changes color.

45. The method of claim 27, wherein the tattooing provides a tattoo that partially or fully changes color.

46. The method of claim 42, wherein the tattooing provides a tattoo that partially or fully changes color.

47. The method of claim 44, wherein the tattoo partially or fully changes color as the particle degrades.

48. The method of claim 45, wherein the tattoo partially or fully changes color as the particle degrades.

49. The method of claim 46, wherein the tattoo partially or fully changes color as the particle degrades.

50. The composition of claim 1, wherein the particle is one of a plurality of particles and the shell polymer is present in an amount that is effective to induce aggregation of the particles upon incorporation into a subject's dermis or sufficient to prevent or inhibit phagocytosis of the coloring agent upon incorporation into a subject's dermis.

51. The composition of claim 9, wherein the particle is one of a plurality of particles and the core polymer is present in an amount that is effective to induce aggregation of the particles upon incorporation into a subject's dermis or sufficient to prevent or inhibit phagocytosis of the coloring agent upon incorporation into a subject's dermis.

52. The composition of claim 30, wherein the particle is one of a plurality of particles and the polymer is present in an amount that is effective to induce aggregation of the particles upon incorporation into a subject's dermis or sufficient to prevent or inhibit phagocytosis of the coloring agent upon incorporation into a subject's dermis.