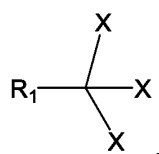


WHAT IS CLAIMED IS:

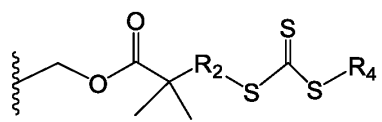
1. A nanoparticle, comprising

a scaffold, a single template site for bonding a template polynucleotide to the scaffold selected from a covalent template bonding site and a noncovalent template bonding site, and a plurality of accessory sites for bonding accessory oligonucleotides to the scaffold selected from covalent accessory oligonucleotide bonding sites and noncovalent accessory oligonucleotide bonding sites, wherein

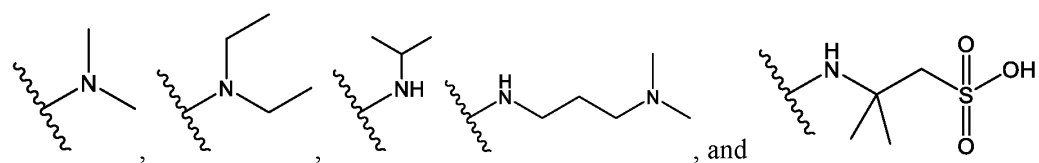
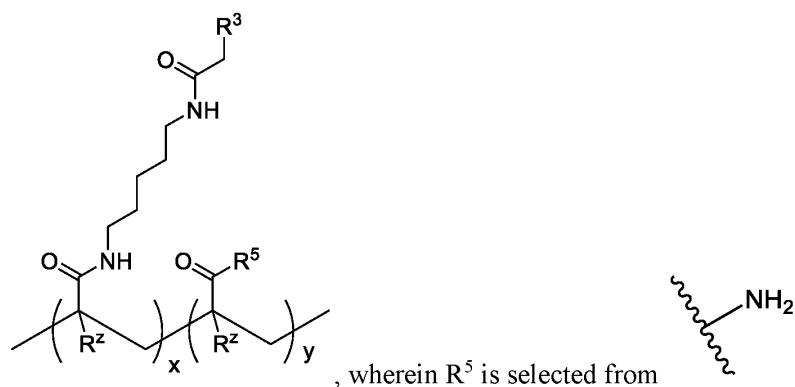
the scaffold is a compound of Formula I:



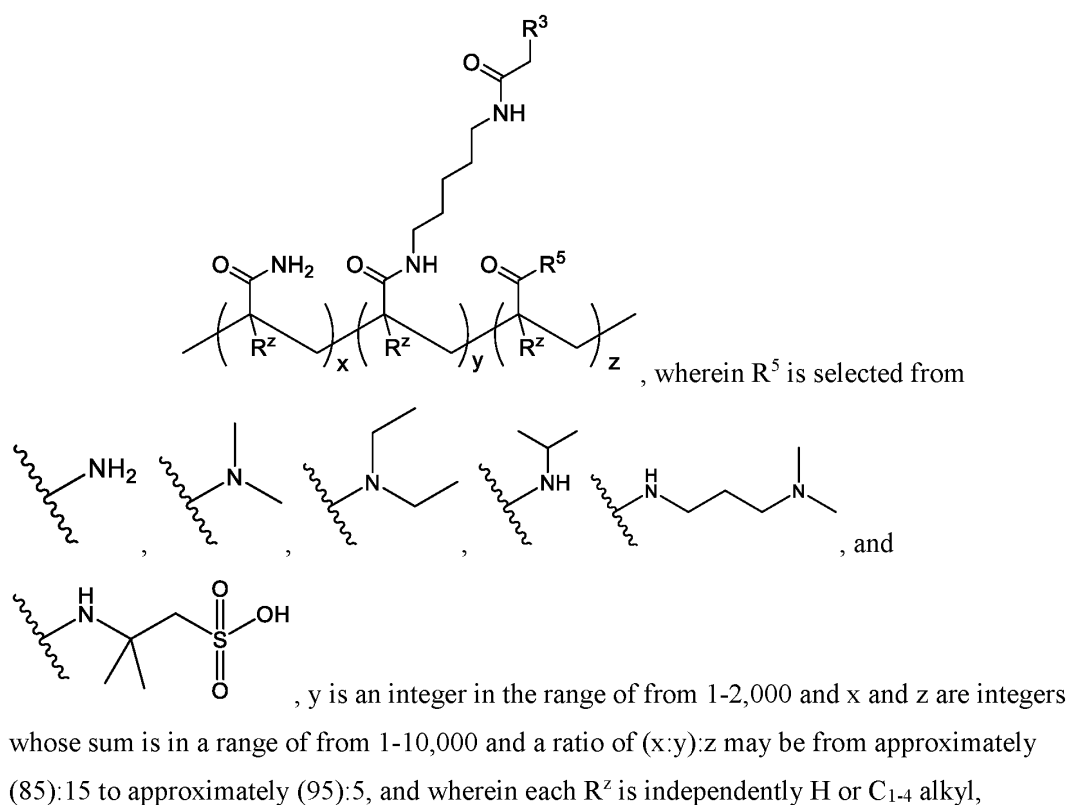
each X is a compound of formula II:



wherein R₂ is selected from Formula IIIa:



x is an integer in the range of from 1-20,000 and y is an integer in the range of from 1-100,000 and a ratio of x:y may be from approximately 10:90 to approximately 1:99, and wherein each R^z is independently H or C₁₋₄ alkyl, and Formula IIIb:



R_1 includes the single template site for bonding a template polynucleotide to the scaffold, R^4 is selected from an optionally substituted C_1 - C_{20} alkyl, an optionally substituted C_1 - C_{20} alkenyl, an optionally substituted C_1 - C_{20} alkynyl, an optionally substituted C_1 - C_{20} oxaalkyl, an optionally substituted C_1 - C_{20} thiaalkyl, and an optionally substituted C_1 - C_{20} azaalkyl, wherein substituted comprises substitution with one or more of a C_1 - C_{20} alkyl, a double-bonded oxygen, and a hydroxyl group, and R^3 includes the accessory site for bonding accessory oligonucleotides.

2. The nanoparticle of claim 1, wherein the single template site comprises a covalent template bonding site.

3. The nanoparticle of claim 2, wherein the covalent template bonding site is selected from amine-NHS ester bonding site, an amine-imidoester bonding site, an amine-pentofluorophenyl ester bonding site, an amine-hydroxymethyl phosphine bonding site, a carboxyl-carbodiimide bonding site, a thiol-maleimide bonding site, a thiol-haloacetyl bonding site, a thiol-pyridyl disulfide bonding site, a thiol-thiosulfonate bonding site, a thiol-vinyl sulfone bonding site, an aldehyde-hydrazide bonding site, an aldehyde-alkoxyamine bonding site, an aldehyde-NHS ester bonding site, a hydroxy-isocyanate bonding site, an azide-alkyne bonding site, an azide-phosphine bonding site, a transcyclooctene-tetrazine

bonding site, a norbornene-tetrazine bonding site, an azide-cyclooctyne bonding site, an azide-norbornene bonding site, an oxime bonding site, a SpyTag-SpyCatcher bonding site, a Snap-tag-O⁶-Benzylguanine bonding site, a CLIP-tag-O²-benzylcytosine bonding site, and a sortase-coupling bonding site.

4. The nanoparticle of any one of claim 1, wherein the single template site comprises a noncovalent template bonding site.

5. The nanoparticle of claim 4, wherein the noncovalent template bonding site comprises a polynucleotide hybridization site.

6. The nanoparticle of claim 4, wherein the noncovalent template bonding site comprises a noncovalent peptide binding site and the noncovalent peptide binding site is selected from a coiled-coil bonding site and an avidin-biotin bonding site.

7. The nanoparticle of any one of claims 1 through 6, wherein the plurality of accessory sites for bonding accessory oligonucleotides to the scaffold comprise covalent accessory oligonucleotide bonding sites.

8. The nanoparticle of claim 7, wherein the covalent accessory oligonucleotide bonding sites are selected from amine-NHS ester bonding sites, amine-imidoester bonding sites, amine-pentofluorophenyl ester bonding sites, amine-hydroxymethyl phosphine bonding sites, carboxyl-carbodiimide bonding sites, thiol-maleimide bonding sites, thiol-haloacetyl bonding sites, thiol-pyridyl disulfide bonding sites, thiol-thiosulfonate bonding sites, thiol-vinyl sulfone bonding sites, aldehyde-hydrazide bonding sites, aldehyde-alkoxyamine bonding sites, hydroxy-isocyanate bonding sites, azide-alkyne bonding sites, azide-phosphine bonding sites, transcyclooctene-tetrazine bonding sites, norbornene-tetrazine bonding sites, an azide-cyclooctyne bonding sites, azide-norbornene bonding sites, oxime bonding sites, SpyTag-SpyCatcher bonding sites, Snap-tag-O⁶-Benzylguanine bonding sites, CLIP-tag-O²-benzylcytosine bonding sites, sortase-coupling bonding sites, and any combination of two or more of the foregoing.

9. The nanoparticle of any one of claims 1 through 6, wherein the accessory oligonucleotide bonding sites comprise noncovalent accessory oligonucleotide bonding sites.

10. The nanoparticle of claim 9, wherein the noncovalent accessory oligonucleotide bonding sites comprise polynucleotide hybridization sites.

11. The nanoparticle of claim 9, wherein the noncovalent accessory oligonucleotide bonding sites comprise noncovalent peptide binding sites and the

noncovalent peptide binding sites are selected from one or both of coiled-coil bonding sites and avidin-biotin bonding sites.

12. The nanoparticle of any one of claims 1 through 11, further comprising a single template polynucleotide bonded to the single template site.

13. The nanoparticle of any one of claims 1 through 12, further comprising a plurality of accessory oligonucleotides bonded to the plurality of accessory sites.

14. The nanoparticle of any one of claims 1 through 13, wherein the nanoparticle is at least about 10 nm in diameter.

15. A method, comprising bonding a single template polynucleotide to the single template site of the nanoparticle of any one of claims 1 through 14.

16. A method, comprising bonding a plurality of accessory oligonucleotides to the plurality of accessory sites of the nanoparticle of any one of claims 1 through 15.

17. The method of claim 15 or 16, further comprising synthesizing one or more scaffold-attached copies selected from copies of the template polynucleotide, copies of the polynucleotides complementary to the template polynucleotide, and copies of both, wherein the scaffold-attached copies extend from the accessory oligonucleotides.

18. The method of any one of claims 15-17, further comprising attaching the scaffold to a substrate, wherein attaching comprises hybridizing accessory oligonucleotides with oligonucleotides attached to the substrate.

19. The method of claim 18, wherein the substrate comprises a plurality of nanowells and the oligonucleotides attached to the substrate are attached within the plurality of nanowells.

20. The method of claim 19, wherein no more than one scaffold binds within any one of the nanowells.

21. The method of any one of claims 18 through 20 further comprising synthesizing one or more substrate-attached copies selected from copies of the template polynucleotide, copies of the polynucleotides complementary to the template polynucleotide, and copies of both, wherein the substrate-attached copies extend from oligonucleotides attached to a substrate.

22. The method of claim 17 or 21, further comprising sequencing at least one of scaffold-attached copies and substrate-attached copies, wherein sequencing comprises sequencing by synthesis.

23. A nanoparticle, comprising

a scaffold, a single template site for bonding a template polynucleotide to the scaffold selected from a covalent template bonding site and a noncovalent template bonding site, and a plurality of accessory sites for bonding accessory oligonucleotides to the scaffold selected from covalent accessory oligonucleotide bonding sites and noncovalent accessory oligonucleotide bonding sites, wherein

the scaffold comprises a dendrimer wherein the dendrimer comprises from 2 to 10 generations of constitutional repeating units, the constitutional repeating units comprise lysine wherein a lysine of an upstream generation forms a peptide bond with a first lysine of an immediately downstream generation and an isopeptide bond with a second lysine of the immediately downstream generation,

the single template site extends from the C-terminal end of the lysine of the first generation of the dendrimer and the plurality of accessory sites extend from NH₂ groups of lysines of the last generation of the dendrimer.

24. The nanoparticle of claim 23, wherein the single template site comprises a covalent template bonding site.

25. The nanoparticle of claim 24, wherein the covalent template bonding site is selected from an amine-NHS ester bonding site, an amine-imidoester bonding site, an amine-pentofluorophenyl ester bonding site, an amine-hydroxymethyl phosphine bonding site, a carboxyl-carbodiimide bonding site, a thiol-maleimide bonding site, a thiol-haloacetyl bonding site, a thiol-pyridyl disulfide bonding site, a thiol-thiosulfonate bonding site, a thiol-vinyl sulfone bonding site, an aldehyde-hydrazide bonding site, an aldehyde-alkoxyamine bonding site, a hydroxy-isocyanate bonding site, an azide-alkyne bonding site, an azide-phosphine bonding site, a transcyclooctene-tetrazine bonding site, a norbornene-tetrazine bonding site, an azide-cyclooctyne bonding site, an azide-norbornene bonding site, an oxime bonding site, a SpyTag-SpyCatcher bonding site, a Snap-tag-O⁶-Benzylguanine bonding site, a CLIP-tag-O²-benzylcytosine bonding site, and a sortase-coupling bonding site.

26. The nanoparticle of any one of claim 23, wherein the single template site comprises a noncovalent template bonding site.

27. The nanoparticle of claim 26, wherein the noncovalent template bonding site comprises a polynucleotide hybridization site.

28. The nanoparticle of claim 28, wherein the noncovalent template bonding site comprises a noncovalent peptide binding site and the noncovalent peptide binding site is selected from a coiled-coil bonding site and an avidin-biotin bonding site.

29. The nanoparticle of any one of claims 23 through 28, wherein the plurality of accessory sites for bonding accessory oligonucleotides to the scaffold comprise covalent accessory oligonucleotide bonding sites.

30. The nanoparticle of claim 29, wherein the covalent accessory oligonucleotide bonding sites are selected from amine-NHS ester bonding sites, amine-imidoester bonding sites, amine-pentofluorophenyl ester bonding sites, amine-hydroxymethyl phosphine bonding sites, carboxyl-carbodiimide bonding sites, thiol-maleimide bonding sites, thiol-haloacetyl bonding sites, thiol-pyridyl disulfide bonding sites, thiol-thiosulfonate bonding sites, thiol-vinyl sulfone bonding sites, aldehyde-hydrazide bonding sites, aldehyde-alkoxyamine bonding sites, hydroxy-isocyanate bonding sites, azide-alkyne bonding sites, azide-phosphine bonding sites, transcyclooctene-tetrazine bonding sites, norbornene-tetrazine bonding sites, an azide-cyclooctyne bonding sites, azide-norbornene bonding sites, oxime bonding sites, SpyTag-SpyCatcher bonding sites, Snap-tag-O⁶-Benzylguanine bonding sites, CLIP-tag-O²-benzylcytosine bonding sites, sortase-coupling bonding sites, and any combination of two or more of the foregoing.

31. The nanoparticle of any one of claims 23 through 28, wherein the accessory oligonucleotide bonding sites comprise noncovalent accessory oligonucleotide bonding sites.

32. The nanoparticle of claim 31, wherein the noncovalent accessory oligonucleotide bonding sites comprise polynucleotide hybridization sites.

33. The nanoparticle of claim 31, wherein the noncovalent accessory oligonucleotide bonding sites comprise noncovalent peptide binding sites and the noncovalent peptide binding sites are selected from one or both of coiled-coil bonding sites and avidin-biotin bonding sites.

34. The nanoparticle of any one of claims 23 through 33, further comprising a single template polynucleotide bonded to the single template site.

35. The nanoparticle of any one of claims 23 through 34, further comprising a plurality of accessory oligonucleotides bonded to the plurality of accessory sites.

36. The nanoparticle of any one of claims 23 through 35, wherein the nanoparticle is at least about 10 nm in diameter.

37. A method, comprising bonding a single template polynucleotide to the single template site of the nanoparticle of any one of claims 23 through 36.

38. A method, comprising bonding a plurality of accessory oligonucleotides to the plurality of accessory sites of the nanoparticle of any one of claims 23 through 37.

39. The method of claim 37 or 38, further comprising synthesizing one or more scaffold-attached copies selected from copies of the template polynucleotide, copies of the polynucleotides complementary to the template polynucleotide, and copies of both, wherein the scaffold-attached copies extend from the accessory oligonucleotides.

40. The method of any one of claims 37-39, further comprising attaching the scaffold to a substrate, wherein attaching comprises hybridizing accessory oligonucleotides with oligonucleotides attached to the substrate.

41. The method of claim 40, wherein the substrate comprises a plurality of nanowells and the oligonucleotides attached to the substrate are attached within the plurality of nanowells.

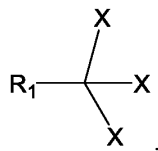
42. The method of claim 41, wherein no more than one scaffold binds within any one of the nanowells.

43. The method of any one of claims 40 through 42 further comprising synthesizing one or more substrate-attached copies selected from copies of the template polynucleotide, copies of the polynucleotides complementary to the template polynucleotide, and copies of both, wherein the substrate-attached copies extend from oligonucleotides attached to a substrate.

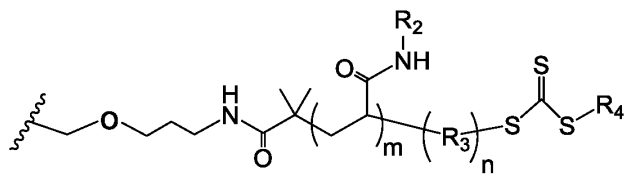
44. The method of claim 39 or 43, further comprising sequencing at least one of scaffold-attached copies and substrate-attached copies, wherein sequencing comprises sequencing by synthesis.

45. A nanoparticle, comprising
a scaffold, a single template site for bonding a template polynucleotide to the scaffold selected from a covalent template bonding site and a noncovalent template bonding site, and a plurality of accessory sites for bonding accessory oligonucleotides to the scaffold selected from covalent accessory oligonucleotide bonding sites and noncovalent accessory oligonucleotide bonding sites, wherein

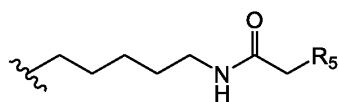
the scaffold is a compound of Formula IV:



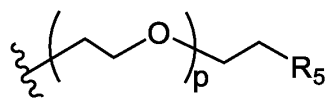
each X is a compound of formula V:



wherein R_2 is selected from Formula VIa:



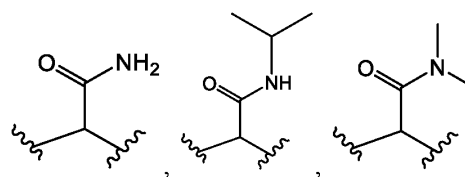
and Formula VIb:



wherein p is an

integer selected from 1 to 20, and R_5 comprises the accessory site for bonding accessory

oligonucleotides, R_3 is selected from a direct bond,



, and m is an integer from 1 to 20,000 and n is an integer from 1 to 100,000,

R^1 comprises the single template site for bonding a template polynucleotide to the scaffold, R^4 is selected from an optionally substituted C_1 - C_{20} alkyl, an optionally substituted C_1 - C_{20} alkenyl, an optionally substituted C_1 - C_{20} alkynyl, an optionally substituted C_1 - C_{20} oxaalkyl, an optionally substituted C_1 - C_{20} thiaalkyl, and an optionally substituted C_1 - C_{20} azaalkyl, wherein substituted comprises substitution with one or more of a C_1 - C_{20} alkyl, a double-bonded oxygen, and a hydroxyl group, and R^3 comprises the accessory site for bonding accessory oligonucleotides.

46. The nanoparticle of claim 45, wherein the single template site comprises a covalent template bonding site.

47. The nanoparticle of claim 46, wherein the covalent template bonding site is selected from an amine-NHS ester bonding site, an amine-imidoester bonding site, an amine-pentofluorophenyl ester bonding site, an amine-hydroxymethyl phosphine bonding site, a carboxyl-carbodiimide bonding site, a thiol-maleimide bonding site, a thiol-haloacetyl bonding site, a thiol-pyridyl disulfide bonding site, a thiol-thiosulfonate bonding site, a thiol-vinyl sulfone bonding site, an aldehyde-hydrazide bonding site, an aldehyde-alkoxyamine

bonding site, a hydroxy-isocyanate bonding site, an azide-alkyne bonding site, an azide-phosphine bonding site, a transcyclooctene-tetrazine bonding site, a norbornene-tetrazine bonding site, an azide-cyclooctyne bonding site, an azide-norbornene bonding site, an oxime bonding site, a SpyTag-SpyCatcher bonding site, a Snap-tag-O⁶-Benzylguanine bonding site, a CLIP-tag-O²-benzylcytosine bonding site, and a sortase-coupling bonding site.

48. The nanoparticle of any one of claim 45, wherein the single template site comprises a noncovalent template bonding site.

49. The nanoparticle of claim 48, wherein the noncovalent template bonding site comprise a polynucleotide hybridization site.

50. The nanoparticle of claim 48, wherein the noncovalent template bonding site comprises a noncovalent peptide binding site and the noncovalent peptide binding site is selected from one or both of a coiled-coil bonding site and an avidin-biotin bonding site.

51. The nanoparticle of any one of claims 45 through 50, wherein the plurality of accessory sites for bonding accessory oligonucleotides to the scaffold comprise covalent accessory oligonucleotide bonding sites.

52. The nanoparticle of claim 51, wherein the covalent accessory oligonucleotide bonding sites are selected from amine-NHS ester bonding sites, amine-imidoester bonding sites, amine-pentofluorophenyl ester bonding sites, amine-hydroxymethyl phosphine bonding sites, carboxyl-carbodiimide bonding sites, thiol-maleimide bonding sites, thiol-haloacetyl bonding sites, thiol-pyridyl disulfide bonding sites, thiol-thiosulfonate bonding sites, thiol-vinyl sulfone bonding sites, aldehyde-hydrazide bonding sites, aldehyde-alkoxyamine bonding sites, hydroxy-isocyanate bonding sites, azide-alkyne bonding sites, azide-phosphine bonding sites, transcyclooctene-tetrazine bonding sites, norbornene-tetrazine bonding sites, an azide-cyclooctyne bonding sites, azide-norbornene bonding sites, oxime bonding sites, SpyTag-SpyCatcher bonding sites, Snap-tag-O⁶-Benzylguanine bonding sites, CLIP-tag-O²-benzylcytosine bonding sites, sortase-coupling bonding sites, and any combination of two or more of the foregoing.

53. The nanoparticle of any one of claims 45 through 50, wherein the accessory oligonucleotide bonding sites comprises noncovalent accessory oligonucleotide bonding sites.

54. The nanoparticle of claim 53, wherein the noncovalent accessory oligonucleotide bonding sites comprise polynucleotide hybridization sites.

55. The nanoparticle of claim 53, wherein the noncovalent accessory oligonucleotide bonding sites comprise noncovalent peptide binding sites and the noncovalent peptide binding sites are selected from one or both of coiled-coil bonding sites and avidin-biotin bonding sites.

56. The nanoparticle of any one of claims 45 through 55, further comprising a single template polynucleotide bonded to the single template site.

57. The nanoparticle of any one of claims 45 through 56, further comprising a plurality of accessory oligonucleotides bonded to the plurality of accessory sites.

58. The nanoparticle of any one of claims 45 through 57, wherein the nanoparticle at least about 10 nm in diameter.

59. A method, comprising bonding a single template polynucleotide to the single template site of the nanoparticle of any one of claims 45 through 58.

60. A method, comprising bonding a plurality of accessory oligonucleotides to the plurality of accessory sites of the nanoparticle of any one of claims 45 through 59.

61. The method of claim 59 or 60, further comprising synthesizing one or more scaffold-attached copies selected from copies of the template polynucleotide, copies of the polynucleotides complementary to the template polynucleotide, and copies of both, wherein the scaffold-attached copies extend from the accessory oligonucleotides.

62. The method of any one of claims 59-61, further comprising attaching the scaffold to a substrate, wherein attaching comprises hybridizing accessory oligonucleotides with oligonucleotides attached to the substrate.

63. The method of claim 62, wherein the substrate comprises a plurality of nanowells and the oligonucleotides attached to the substrate are attached within the plurality of nanowells.

64. The method of claim 63, wherein no more than one scaffold binds within any one of the nanowells.

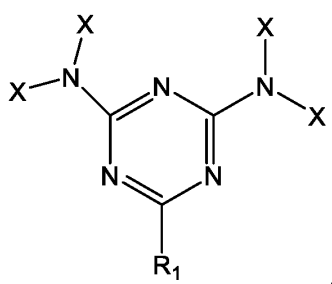
65. The method of any one of claims 62 through 64 further comprising synthesizing one or more substrate-attached copies selected from copies of the template polynucleotide, copies of the polynucleotides complementary to the template polynucleotide, and copies of both, wherein the substrate-attached copies extend from oligonucleotides attached to a substrate.

66. The method of claim 61 or 65, further comprising sequencing at least one of scaffold-attached copies and substrate-attached copies, wherein sequencing comprises sequencing by synthesis.

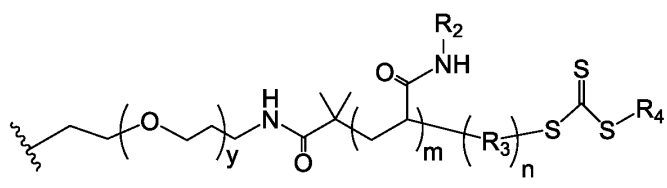
67. A nanoparticle, comprising

a scaffold, a single template site for bonding a template polynucleotide to the scaffold selected from a covalent template bonding site and a noncovalent template bonding site, and a plurality of accessory sites for bonding accessory oligonucleotides to the scaffold selected from covalent accessory oligonucleotide bonding sites and noncovalent accessory oligonucleotide bonding sites, wherein

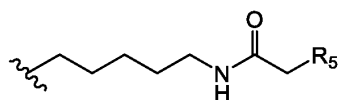
the scaffold is a compound of Formula VII:



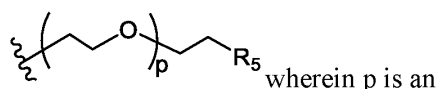
each X is a compound of formula VIII:



wherein y is an integer from 1 to 20, R₂ is selected from Formula IXa:

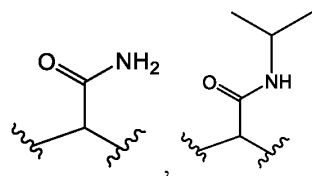


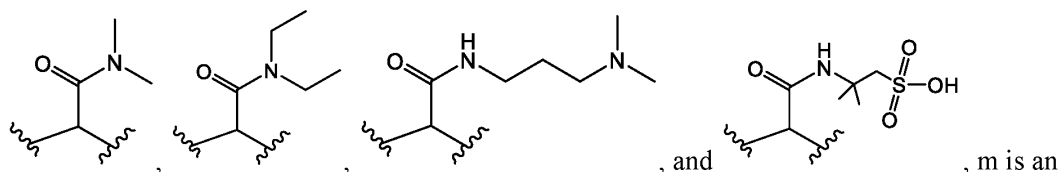
and Formula IXb:



wherein p is an integer selected from 1 to 20, and R₅ comprises the accessory site for bonding accessory

oligonucleotides, R₃ is selected from a direct bond,





integer from 1 to 2,000 and n is an integer from 1 to 10,000,

R^1 comprises the single template site for bonding a template polynucleotide to the scaffold, R^4 is selected from an optionally substituted C_1 - C_{20} alkyl, an optionally substituted C_1 - C_{20} alkenyl, an optionally substituted C_1 - C_{20} alkynyl, an optionally substituted C_1 - C_{20} oxaalkyl, an optionally substituted C_1 - C_{20} thiaalkyl, and an optionally substituted C_1 - C_{20} azaalkyl, wherein substituted comprises substitution with one or more of a C_1 - C_{20} alkyl, a double-bonded oxygen, and a hydroxyl group, and R^3 comprises the accessory site for bonding accessory oligonucleotides.

68. The nanoparticle of claim 67, wherein the single template site comprises a covalent template bonding site.

69. The nanoparticle of claim 68, wherein the covalent template bonding site is selected from an amine-NHS ester bonding site, an amine-imidoester bonding site, an amine-pentofluorophenyl ester bonding site, an amine-hydroxymethyl phosphine bonding site, a carboxyl-carbodiimide bonding site, a thiol-maleimide bonding site, a thiol-haloacetyl bonding site, a thiol-pyridyl disulfide bonding site, a thiol-thiosulfonate bonding site, a thiol-vinyl sulfone bonding site, an aldehyde-hydrazone bonding site, an aldehyde-alkoxyamine bonding site, a hydroxy-isocyanate bonding site, an azide-alkyne bonding site, an azide-phosphine bonding site, a transcyclooctene-tetrazine bonding site, a norbornene-tetrazine bonding site, an azide-cyclooctyne bonding site, an azide-norbornene bonding site, an oxime bonding site, a SpyTag-SpyCatcher bonding site, a Snap-tag- O^6 -Benzylguanine bonding site, a CLIP-tag- O^2 -benzylcytosine bonding site, and a sortase-coupling bonding site.

70. The nanoparticle of any one of claim 67, wherein the single template site comprises a noncovalent template bonding site.

71. The nanoparticle of claim 70, wherein the noncovalent template bonding site comprises a polynucleotide hybridization site.

72. The nanoparticle of claim 70, wherein the noncovalent template bonding site comprises a noncovalent peptide binding site and the noncovalent peptide binding site is selected from a coiled-coil bonding site and an avidin-biotin bonding site.

73. The nanoparticle of any one of claims 67 through 72, wherein the plurality of accessory sites for bonding accessory oligonucleotides to the scaffold comprise covalent accessory oligonucleotide bonding sites.

74. The nanoparticle of claim 73, wherein the covalent accessory oligonucleotide bonding sites are selected from amine-NHS ester bonding sites, amine-imidoester bonding sites, amine-pentofluorophenyl ester bonding sites, amine-hydroxymethyl phosphine bonding sites, carboxyl-carbodiimide bonding sites, thiol-maleimide bonding sites, thiol-haloacetyl bonding sites, thiol-pyridyl disulfide bonding sites, thiol-thiosulfonate bonding sites, thiol-vinyl sulfone bonding sites, aldehyde-hydrazide bonding sites, aldehyde-alkoxyamine bonding sites, hydroxy-isocyanate bonding sites, azide-alkyne bonding sites, azide-phosphine bonding sites, transcyclooctene-tetrazine bonding sites, norbornene-tetrazine bonding sites, an azide-cyclooctyne bonding sites, azide-norbornene bonding sites, oxime bonding sites, SpyTag-SpyCatcher bonding sites, Snap-tag-O⁶-Benzylguanine bonding sites, CLIP-tag-O²-benzylcytosine bonding sites, sortase-coupling bonding sites, and any combination of two or more of the foregoing.

75. The nanoparticle of any one of claims 67 through 72, wherein the accessory oligonucleotide bonding sites comprises noncovalent accessory oligonucleotide bonding sites.

76. The nanoparticle of claim 75, wherein the noncovalent accessory oligonucleotide bonding sites comprise polynucleotide hybridization sites.

77. The nanoparticle of claim 75, wherein the noncovalent accessory oligonucleotide bonding sites comprise noncovalent peptide binding sites and the noncovalent peptide binding sites are selected from one or both of coiled-coil bonding sites and avidin-biotin bonding sites.

78. The nanoparticle of any one of claims 67 through 77, further comprising a single template polynucleotide bonded to the single template site.

79. The nanoparticle of any one of claims 67 through 78, further comprising a plurality of accessory oligonucleotides bonded to the plurality of accessory sites.

80. The nanoparticle of any one of claims 67 through 79 wherein the nanoparticle is at least about 10 nm in diameter.

81. A method, comprising bonding a single template polynucleotide to the single template site of the nanoparticle of any one of claims 67 through 80.

82. A method, comprising bonding a plurality of accessory oligonucleotides to the plurality of accessory sites of the nanoparticle of any one of claims 67 through 81.

83. The method of claim 81 or 82, further comprising synthesizing one or more scaffold-attached copies selected from copies of the template polynucleotide, copies of the polynucleotides complementary to the template polynucleotide, and copies of both, wherein the scaffold-attached copies extend from the accessory oligonucleotides.

84. The method of any one of claims 81-83, further comprising attaching the scaffold to a substrate, wherein attaching comprises hybridizing accessory oligonucleotides with oligonucleotides attached to the substrate.

85. The method of claim 84, wherein the substrate comprises a plurality of nanowells and the oligonucleotides attached to the substrate are attached within the plurality of nanowells.

86. The method of claim 85, wherein no more than one scaffold binds within any one of the nanowells.

87. The method of any one of claims 84 through 86 further comprising synthesizing one or more substrate-attached copies selected from copies of the template polynucleotide, copies of the polynucleotides complementary to the template polynucleotide, and copies of both, wherein the substrate-attached copies extend from oligonucleotides attached to a substrate.

88. The method of claim 83 or 87, further comprising sequencing at least one of scaffold-attached copies and substrate-attached copies, wherein sequencing comprises sequencing by synthesis.