WHAT IS CLAIMED IS:

1. A chromatography device comprising:

a device housing; and

chromatography media positioned within said device housing, said media comprising porous inorganic particles having a functionalized surface, said porous inorganic particles having a median pore size of at least 300 Angstroms (Å); a pore size distribution relative span of at least about 0.8; and said functionalized surface comprises at least one molecule having a molecular weight of greater than about 300 g/mol.

2. The chromatography device of claim 1, wherein said porous inorganic particles have a median pore size of at least 500 Å.

3. The chromatography device of claim 1 or 2, wherein said porous inorganic particles have a median pore size of at least 800 Å.

4. The chromatography device of any one of claims 1 to 3, wherein said porous inorganic particles have a BET surface area of from about 20 m^2/g to about 2000 m^2/g.

5. The chromatography device of any one of claims 1 to 4, wherein said porous inorganic particles have a pore volume of at least about 1 cc/g by mercury porosimetry.

6. The chromatography device of any one of claims 1 to 5, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 120 µm.

7. The chromatography device of any one of claims 1 to 5, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 90 µm.

8. The chromatography device of any one of claims 1 to 7, wherein said porous inorganic particles comprise silica, alumina, zirconia, or mixtures thereof.

9. The chromatography device of any one of claims 1 to 8, wherein said porous inorganic particles comprise silica having at least 97% by weight SiO_2 based upon the total weight of the particles.

10. The chromatography device of any one of claims 1 to 9, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 g/mol.

11. The chromatography device of any one of claims 1 to 9, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 g/mol up to about 500,000 g/mol.

12. The chromatography device of any one of claims 1 to 11, wherein said porous inorganic particles have one or more ligands bonded to the functionalized surface.

13. The chromatography device of claim 12, wherein said one or more ligands comprise sulfonic acid, quarternary ammonium, diethyl aminoethyl, carboxyl methyl groups; synthetic dyes; alkyl and aryl compounds; proteins; lectins; antibodies; antigens, enzymes or combinations thereof.

14. The chromatography device of any one of claims 1 to 13, wherein said porous inorganic particles have a pore size distribution relative span of at least about 0.9.

15. The chromatography device of any one of claims 1 to 13, wherein said porous inorganic particles have a pore size distribution relative span of at least about 1.0.

16. The chromatography device of any one of claims 1 to 15, wherein said device housing comprises a tubular housing member, and at least one separate and attachable tubular housing member end cap.

17. The chromatography device of any one of claims 1 to 16, wherein said device housing comprises a polymeric material, a metal material, a glass material, a ceramic material, or a composite thereof.

18. The chromatography device of any one of claims 1 to 16, wherein said device housing comprises a biodegradable polymeric material.

20. A method of making the chromatography device of any one of claims 1 to 19, said method comprising the steps of:

incorporating porous inorganic particles into the device housing.

21. The method of claim 20, further comprising:

forming the device housing via a thermoforming step.

22. The method of claim 20, wherein said thermoforming step comprises thermoforming a tubular housing member, and at least one separate and attachable tubular housing member end cap.

26. The method of any one of claims 20 to 25, further comprising:

validating the chromatography device via one or more validation tests.

27. A method of using the chromatography device of any one of claims 1 to 19, said method comprising:

positioning the chromatography device within an operating position of a chromatography system; and

processing a fluid through the chromatography device.

28. The method of claim 27, wherein the fluid comprises one or more biomolecules.

29. The method of claim 27 or 28, wherein the fluid comprises a protein, a peptide, an oligonucleotide, an antibody, a virus, a vaccine or any combination thereof.

31. The method of any one of claims 27 to 30, wherein said method does not comprise a clean-in-place step within the chromatography system.

32. A method of using the chromatography device of any one of claims 1 to 19, said method comprising:

providing the chromatography device to a user, said providing step comprising providing a pre-packed and validated chromatography device to the user.

33. A chromatography media comprising:

porous inorganic particles having a functionalized surface, said porous inorganic particles having a median pore size of at least 300 Angstroms (Å); a pore size distribution relative span of at least about 0.8; and said functionalized surface comprises at least one molecule having a molecular weight of greater than about 300 g/mol.

34. The chromatography media of claim 33, wherein said porous inorganic particles have a median pore size of at least 500 Å.

35. The chromatography media of claim 33 or 34, wherein said porous inorganic particles have a median pore size of at least 800 Å.

36. The chromatography media of any one of claims 33 to 35, wherein said porous inorganic particles have a BET surface area of from about 1 m^2/g to about 2000 m^2/g.

37. The chromatography media of any one of claims 33 to 36, wherein said porous inorganic particles have a pore volume of at least about 1 cc/g.

38. The chromatography media of any one of claims 33 to 37, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 120 µm.

39. The chromatography media of any one of claims 33 to 37, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 90 µm.

40. The chromatography media of any one of claims 33 to 39, wherein said porous inorganic particles comprise silica, alumina, zirconia, or mixtures thereof.

41. The chromatography media of any one of claims 33 to 40, wherein said porous inorganic particles comprise silica having at least 93% by weight SiO_2 based upon the total weight of the particles.

42. The chromatography media of any one of claims 33 to 41, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 g/mol.

43. The chromatography media of any one of claims 33 to 40, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 up to about 500,000 g/mol.

44. The chromatography media of any one of claims 33 to 43, wherein said porous inorganic particles have one or more ligands bonded to the functionalized surface.

45. The chromatography media of claim 44, wherein said one or more ligands comprise sulfonic acid, quarternary ammonium, diethyl aminoethyl, carboxyl methyl

groups; synthetic dyes; alkyl and aryl compounds; proteins; lectins; antibodies; antigens, enzymes or combinations thereof .

46. The chromatography media of any one of claims 33 to 45, wherein said porous inorganic particles have a pore size distribution relative span of at least about 0.9.

47. The chromatography media of any one of claims 33 to 45, wherein said porous inorganic particles have a pore size distribution relative span of at least about 1.0.

48. A chromatography device comprising:

a device housing; and

chromatography media positioned within said device housing, said media comprising porous inorganic particles having a functionalized surface, said porous inorganic particles having a median pore size of at least 300 Angstroms (Å); and said functionalized surface comprises at least one molecule having a molecular weight of greater than about 300 g/mol;

wherein said inorganic particles comprise inorganic oxide having a purity of at least 97% by weight SiO_2 based upon the total weight of the particles.

49. The chromatography device of claim 48, wherein said porous inorganic particles have a median pore size of at least 500 Å.

50. The chromatography device of claim 48 or 49, wherein said porous inorganic particles have a median pore size of at least 800 Å.

51. The chromatography device of any one of claims 48 to 50, wherein said porous inorganic particles have a BET surface area of from about 20 m^2/g to about 2000 m^2/g.

52. The chromatography device of any one of claims 48 to 51, wherein said porous inorganic particles have a pore volume of at least about 1 cc/g.

53. The chromatography device of any one of claims 48 to 52, wherein said porous inorganic particles have a median particle dimension of from about 10 μm to about 120 μm.

54. The chromatography device of any one of claims 48 to 52, wherein said porous inorganic particles have a median particle dimension of from about 10 μm to about 90 μm.

55. The chromatography device of any one of claims 48 to 54, wherein said porous inorganic particles comprise silica, alumina, zirconia, or mixtures thereof.

56. The chromatography device of any one of claims 48 to 55, wherein said porous inorganic particles comprise silica having at least 95% by weight SiO_2 based upon the total weight of the particles.

57. The chromatography device of any one of claims 48 to 56, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 g/mol.

58. The chromatography device of any one of claims 48 to 56, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 up to about 500,000 g/mol.

59. The chromatography device of any one of claims 48 to 58, wherein said porous inorganic particles have one or more ligands bonded to the functionalized surface.

60. The chromatography device of claim 59, wherein said one or more ligands comprise sulfonic acid, quarternary ammonium, diethyl aminoethyl, carboxyl methyl groups; synthetic dyes; alkyl and aryl compounds; proteins; lectins; antibodies; antigens, enzymes or combinations thereof.

61. The chromatography device of any one of claims 48 to 60, wherein said porous inorganic particles have a pore size distribution relative span of at least about 0.9.

62. The chromatography device of any one of claims 48 to 60, wherein said porous inorganic particles have a pore size distribution relative span of at least about 1.0.

63. A chromatography media comprising:

porous inorganic particles having a functionalized surface, said porous inorganic particles having a median pore size of at least 300 Angstroms (Å); and said functionalized surface comprises at least one molecule having a molecular weight of greater than about 300 g/mol;

wherein said inorganic particles comprise inorganic oxide having a purity of at least 97% by weight SiO_2 based upon the total weight of the particles.

64. The chromatography media of claim 63, wherein said porous inorganic particles have a median pore size of at least 500 Å.

65. The chromatography media of claim 63 or 64, wherein said porous inorganic particles have a median pore size of at least 800 Å.

66. The chromatography media of any one of claims 63 to 65, wherein said porous inorganic particles have a BET surface area of from about 30 m^2/g to about 2000 m^2/g.

67. The chromatography media of any one of claims 63 to 66, wherein said porous inorganic particles have a pore volume of at least about 1 cc/g.

68. The chromatography media of any one of claims 63 to 67, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 120 µm.

69. The chromatography media of any one of claims 63 to 67, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 90 µm.

70. The chromatography media of any one of claims 63 to 69, wherein said porous inorganic particles comprise silica, alumina, zirconia, or mixtures thereof.

71. The chromatography media of any one of claims 63 to 70, wherein said porous inorganic particles comprise silica having at least 97% by weight SiO_2 based upon the total weight of the particles.

72. The chromatography media of any one of claims 63 to 71, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 g/mol.

73. The chromatography media of any one of claims 63 to 71, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 up to about 500,000 g/mol.

74. The chromatography media of any one of claims 63 to 73, wherein said porous inorganic particles have one or more ligands bonded to the functionalized surface.

75. The chromatography media of claim 74, wherein said one or more ligands comprise sulfonic acid, quarternary ammonium, diethyl aminoethyl, carboxyl methyl groups; synthetic dyes; alkyl and aryl compounds; proteins; lectins; antibodies; antigens, enzymes or combinations thereof.

76. The chromatography media of any one of claims 63 to 75, wherein said porous inorganic particles have a pore size distribution relative span of at least about 0.9.

77. The chromatography media of any one of claims 63 to 75, wherein said porous inorganic particles have a pore size distribution relative span of at least about 1.0.

WHAT IS CLAIMED IS:

1. A chromatography device comprising:

a device housing; and

chromatography media positioned within said device housing, said media comprising porous inorganic particles having a functionalized surface, said porous inorganic particles having a median pore size of at least 300 Angstroms (Å); a pore size distribution relative span of at least about 0.8; and said functionalized surface comprises at least one molecule having a molecular weight of greater than about 300 g/mol.

2. The chromatography device of claim 1, wherein said porous inorganic particles have a median pore size of at least 500 Å.

3. The chromatography device of claim 1 or 2, wherein said porous inorganic particles have a median pore size of at least 800 Å.

4. The chromatography device of any one of claims 1 to 3, wherein said porous inorganic particles have a BET surface area of from about 20 m^2/g to about 2000 m^2/g.

5. The chromatography device of any one of claims 1 to 4, wherein said porous inorganic particles have a pore volume of at least about 1 cc/g by mercury porosimetry.

6. The chromatography device of any one of claims 1 to 5, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 120 µm.

7. The chromatography device of any one of claims 1 to 5, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 90 µm.

8. The chromatography device of any one of claims 1 to 7, wherein said porous inorganic particles comprise silica, alumina, zirconia, or mixtures thereof.

9. The chromatography device of any one of claims 1 to 8, wherein said porous inorganic particles comprise silica having at least 97% by weight SiO_2 based upon the total weight of the particles.

10. The chromatography device of any one of claims 1 to 9, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 g/mol.

11. The chromatography device of any one of claims 1 to 9, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 g/mol up to about 500,000 g/mol.

12. The chromatography device of any one of claims 1 to 11, wherein said porous inorganic particles have one or more ligands bonded to the functionalized surface.

13. The chromatography device of claim 12, wherein said one or more ligands comprise sulfonic acid, quarternary ammonium, diethyl aminoethyl, carboxyl methyl groups; synthetic dyes; alkyl and aryl compounds; proteins; lectins; antibodies; antigens, enzymes or combinations thereof.

14. The chromatography device of any one of claims 1 to 13, wherein said porous inorganic particles have a pore size distribution relative span of at least about 0.9.

15. The chromatography device of any one of claims 1 to 13, wherein said porous inorganic particles have a pore size distribution relative span of at least about 1.0.

16. The chromatography device of any one of claims 1 to 15, wherein said device housing comprises a tubular housing member, and at least one separate and attachable tubular housing member end cap.

17. The chromatography device of any one of claims 1 to 16, wherein said device housing comprises a polymeric material, a metal material, a glass material, a ceramic material, or a composite thereof.

18. The chromatography device of any one of claims 1 to 16, wherein said device housing comprises a biodegradable polymeric material.

19. A method of making the chromatography device of any one of claims 1 to 18, said method comprising the steps of:

incorporating porous inorganic particles into the device housing.

20. The method of claim 19, further comprising:

forming the device housing via a thermoforming step.

21. The method of claim 19, wherein said thermoforming step comprises thermoforming a tubular housing member, and at least one separate and attachable tubular housing member end cap.

22. The method of any one of claims 19 to 21, further comprising:

validating the chromatography device via one or more validation tests.

23. A method of using the chromatography device of any one of claims 1 to 18, said method comprising:

positioning the chromatography device within an operating position of a chromatography system; and

processing a fluid through the chromatography device.

24. The method of claim 23, wherein the fluid comprises one or more biomolecules.

25. The method of claim 23 or 24, wherein the fluid comprises a protein, a peptide, an oligonucleotide, an antibody, a virus, a vaccine or any combination thereof.

26. The method of any one of claims 23 to 25, wherein said method does not comprise a clean-in-place step within the chromatography system.

27. A method of using the chromatography device of any one of claims 1 to 18, said method comprising:

providing the chromatography device to a user, said providing step comprising providing a pre-packed and validated chromatography device to the user.

28. A chromatography media comprising:

porous inorganic particles having a functionalized surface, said porous inorganic particles having a median pore size of at least 300 Angstroms (Å); a pore size distribution relative span of at least about 0.8; and said functionalized surface comprises at least one molecule having a molecular weight of greater than about 300 g/mol.

29. The chromatography media of claim 28, wherein said porous inorganic particles have a median pore size of at least 500 Å.

30. The chromatography media of claim 28 or 29, wherein said porous inorganic particles have a median pore size of at least 800 Å.

31. The chromatography media of any one of claims 28 to 30, wherein said porous inorganic particles have a BET surface area of from about 1 m^2/g to about 2000 m^2/g.

32. The chromatography media of any one of claims 28 to 31, wherein said porous inorganic particles have a pore volume of at least about 1 cc/g.

33. The chromatography media of any one of claims 28 to 32, wherein said porous inorganic particles have a median particle dimension of from about 10 μm to about 120 μm.

34. The chromatography media of any one of claims 28 to 32, wherein said porous inorganic particles have a median particle dimension of from about 10 μm to about 90 μm.

35. The chromatography media of any one of claims 28 to 34, wherein said porous inorganic particles comprise silica, alumina, zirconia, or mixtures thereof.

36. The chromatography media of any one of claims 28 to 35, wherein said porous inorganic particles comprise silica having at least 93% by weight SiO_2 based upon the total weight of the particles.

37. The chromatography media of any one of claims 28 to 36, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 g/mol.

38. The chromatography media of any one of claims 28 to 35, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 up to about 500,000 g/mol.

39. The chromatography media of any one of claims 28 to 38, wherein said porous inorganic particles have one or more ligands bonded to the functionalized surface.

40. The chromatography media of claim 39, wherein said one or more ligands comprise sulfonic acid, quarternary ammonium, diethyl aminoethyl, carboxyl methyl groups; synthetic dyes; alkyl and aryl compounds; proteins; lectins; antibodies; antigens, enzymes or combinations thereof .

41. The chromatography media of any one of claims 28 to 40, wherein said porous inorganic particles have a pore size distribution relative span of at least about 0.9.

42. The chromatography media of any one of claims 28 to 40, wherein said porous inorganic particles have a pore size distribution relative span of at least about 1.0.

43. A chromatography device comprising:

a device housing; and

chromatography media positioned within said device housing, said media comprising porous inorganic particles having a functionalized surface, said porous inorganic particles having a median pore size of at least 300 Angstroms (Å); and said functionalized surface comprises at least one molecule having a molecular weight of greater than about 300 g/mol;

wherein said inorganic particles comprise inorganic oxide having a purity of at least 97% by weight SiO_2 based upon the total weight of the particles.

44. The chromatography device of claim 43, wherein said porous inorganic particles have a median pore size of at least 500 Å.

45. The chromatography device of claim 43 or 44, wherein said porous inorganic particles have a median pore size of at least 800 Å.

46. The chromatography device of any one of claims 43 to 45, wherein said porous inorganic particles have a BET surface area of from about 20 m^2/g to about 2000 m^2/g.

47. The chromatography device of any one of claims 43 to 46, wherein said porous inorganic particles have a pore volume of at least about 1 cc/g.

48. The chromatography device of any one of claims 43 to 47, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 120 µm.

49. The chromatography device of any one of claims 43 to 47, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 90 µm.

50. The chromatography device of any one of claims 43 to 49, wherein said porous inorganic particles comprise silica, alumina, zirconia, or mixtures thereof.

51. The chromatography device of any one of claims 43 to 50, wherein said porous inorganic particles comprise silica having at least 95% by weight SiO_2 based upon the total weight of the particles.

52. The chromatography device of any one of claims 43 to 51, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 g/mol.

53. The chromatography device of any one of claims 43 to 51, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 up to about 500,000 g/mol.

54. The chromatography device of any one of claims 43 to 53, wherein said porous inorganic particles have one or more ligands bonded to the functionalized surface.

55. The chromatography device of claim 54, wherein said one or more ligands comprise sulfonic acid, quarternary ammonium, diethyl aminoethyl, carboxyl methyl groups; synthetic dyes; alkyl and aryl compounds; proteins; lectins; antibodies; antigens, enzymes or combinations thereof.

56. The chromatography device of any one of claims 43 to 55, wherein said porous inorganic particles have a pore size distribution relative span of at least about 0.9.

57. The chromatography device of any one of claims 43 to 55, wherein said porous inorganic particles have a pore size distribution relative span of at least about 1.0.

58. A chromatography media comprising:

porous inorganic particles having a functionalized surface, said porous inorganic particles having a median pore size of at least 300 Angstroms (Å); and said functionalized surface comprises at least one molecule having a molecular weight of greater than about 300 g/mol;

wherein said inorganic particles comprise inorganic oxide having a purity of at least 97% by weight SiO_2 based upon the total weight of the particles.

59. The chromatography media of claim 58, wherein said porous inorganic particles have a median pore size of at least 500 Å.

60. The chromatography media of claim 58 or 59, wherein said porous inorganic particles have a median pore size of at least 800 Å.

61. The chromatography media of any one of claims 58 to 60, wherein said porous inorganic particles have a BET surface area of from about 30 m^2/g to about 2000 m^2/g.

62. The chromatography media of any one of claims 58 to 61, wherein said porous inorganic particles have a pore volume of at least about 1 cc/g.

63. The chromatography media of any one of claims 58 to 62, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 120 µm.

64. The chromatography media of any one of claims 58 to 62, wherein said porous inorganic particles have a median particle dimension of from about 10 µm to about 90 µm.

65. The chromatography media of any one of claims 58 to 64, wherein said porous inorganic particles comprise silica, alumina, zirconia, or mixtures thereof.

66. The chromatography media of any one of claims 58 to 65, wherein said porous inorganic particles comprise silica having at least 97% by weight SiO_2 based upon the total weight of the particles.

67. The chromatography media of any one of claims 58 to 66, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 g/mol.

68. The chromatography media of any one of claims 58 to 66, wherein said functionalized surface comprises at least one molecule having a molecular weight greater than about 500 up to about 500,000 g/mol.

69. The chromatography media of any one of claims 58 to 68, wherein said porous inorganic particles have one or more ligands bonded to the functionalized surface.

70. The chromatography media of claim 69, wherein said one or more ligands comprise sulfonic acid, quarternary ammonium, diethyl aminoethyl, carboxyl methyl groups; synthetic dyes; alkyl and aryl compounds; proteins; lectins; antibodies; antigens, enzymes or combinations thereof.

71. The chromatography media of any one of claims 58 to 70, wherein said porous inorganic particles have a pore size distribution relative span of at least about 0.9.

72. The chromatography media of any one of claims 58 to 70, wherein said porous inorganic particles have a pore size distribution relative span of at least about 1.0.