CLAIMS

1. A porous article comprising

a porous expanded polytetrafluoroethylene (ePTFE) membrane ;

a coherent irregular network comprising particles of at least one thermoplastic fluoropolymer fused together; and

an adjacent region positioned between said ePTFE membrane and said coherent irregular network, said porous expanded ePTFE membrane being attached to the coherent irregular network at the adjacent region,

wherein the coherent irregular network comprises open areas, and

wherein at least one of the open areas is greater than 100 µm in size, wherein the size of an open area is defined as the distance of the longest straight line that can be drawn across the open area.

2. The porous article of claim 1 having a specific flow resistance of less than 2400 kPa s/m (krayls) and greater than 0.24 kPa s/m (krayls).

3. The porous article of claim 1, wherein the coherent irregular network comprises a plurality of voids and is affixed to said porous ePTFE membrane at only a portion of the adjacent region.

4. The porous article of claim 1, wherein the coherent irregular network comprises bridging.

5. The porous article of claim 1, wherein the coherent irregular network is greater than 5 µm thick.

6. The porous article of claim 1, wherein the coherent irregular network is greater than 5 µm thick and less than 500 µm thick.

7. The porous article of claim 1 having a surface roughness (Sp) greater than 35 µm on at least one surface.

8. The porous article of claim 1, wherein the particles of the at least one thermoplastic fluoropolymer has an melt flow index (MFI) between 0.3 g/10min and 10g/10min when tested at 372 °C and 2.16 kg load.

9. The porous article of claim 1, wherein the particles of the at least one thermoplastic fluoropolymer consists of fluorinated ethylene propylene (FEP).

10. The porous article of claim 8, wherein the FEP has a melt flow index (MFI) of less than 1.0 g/10 min when tested at 372 °C and 2.16 kg load.

11. The porous article of claim 1, wherein the coherent irregular network has a BET surface area of at least 0.35 m^2/g.

12. The porous article of claim 1, wherein the coherent irregular network has a BET surface area between 0.25 m^2/g and 5 m^2/g.

13. The porous article of claim 1 having a percent area shrinkage of less than 20%.

14. The porous article of claim 1, having a percent area shrinkage of less than 5%.

15. The porous article of claim 1, further comprising a hydrophilic coating on the porous ePTFE membrane or on the coherent irregular network and wherein the porous article is hydrophilic.

16. The porous article of claim 1, further comprising an oleophobic coating on the porous ePTFE membrane or on the coherent irregular network and wherein the porous article is oleophobic.

17. The porous article of claim 1 in the form of a sheet.

18. The porous article of claim 1, further comprising a support layer.

19. The porous article of claim 18, wherein the support layer is affixed to said coherent irregular network.

20. The porous article of claim 18, wherein the support layer is affixed to said porous ePTFE membrane.

21. The porous article of claim 1, wherein the coherent irregular network further comprises a pattern.

22. The porous article of claim 21, wherein the coherent irregular network is in a linear pattern, comprising multiple and relatively parallel lengths of the coherent irregular network between parallel lengths of the open areas, where there is no coherent irregular network on the porous ePTFE membrane.

23. The porous article of claim 21, wherein the coherent irregular network is in a discrete pattern, comprising discrete sections of the coherent irregular network surrounded by the open areas.

24. The porous article of claim 21, wherein the coherent irregular network is in a connected pattern, comprising connected coherent irregular network and discrete open area.

25. The porous article of claim 1, wherein a ratio of thickness of the porous membrane to the coherent irregular network ranges from 1:10 to 1:200.

26. A porous article comprising:

a porous expanded fluoropolymer membrane and

a coherent irregular network comprising particles of at least one thermoplastic polymer fused together,

wherein a surface of said porous expanded fluoropolymer membrane comprises at least one adjacent region at which said coherent irregular network is attached.

wherein the coherent irregular network is attached to said expanded fluoropolymer membrane at only a portion of the adjacent region,

wherein the coherent irregular network comprises open areas,

wherein at least one of the open areas is greater than 100 μm in size, wherein the size of an open area is defined as the distance of the longest straight line that can be drawn across the open area,

wherein said at least one thermoplastic polymer is a thermoplastic fluoropolymer, and

wherein the particles of the at least one thermoplastic fluoropolymer have a melt flow index (MFI) between 0.3 g/10 min and 10g/10 min when tested at 372 °C and 2.16 kg load.

27. The porous article of claim 26, wherein the at least one thermoplastic polymer further comprises a first thermoplastic polymer and a second thermoplastic polymer.

28. The porous article of claim 27, wherein the first thermoplastic polymer has a lower melting point than the second thermoplastic polymer.

29. The porous article of claim 26, wherein the at least one thermoplastic polymer further comprises a plurality of thermoplastic polymers.

30. The porous article of claim 26, having a specific flow resistance of less than 2400 kPa s/m (krayls) and greater than kPa s/m (0.24 krayls).

31. The porous article of claim 26, wherein said expanded fluoropolymer membrane is expanded polytetrafluoroethylene (ePTFE).

32. The porous article of claim 26, wherein the coherent irregular network comprises bridging.

33. The porous article of claim 26, wherein the coherent irregular network is greater than 5 µm thick.

34. The porous article of claim 26, wherein the coherent irregular network is greater than 5 µm thick and less than 500 µm thick.

35. The porous article of claim 26, having a Sp value greater than 35 µm on at least one surface.

36. The porous article of claim 26, wherein said at least one thermoplastic polymer is a thermoplastic fluoropolymer, and wherein the particles of the at least one thermoplastic fluoropolymer have a melt flow index (MFI) between 0.3 g/10 min and 10g/10 min when tested at 372 °C and 2.16 kg load.

37. The porous article of claim 36, wherein the particles of the at least one thermoplastic fluoropolymer consist of fluorinated ethylene propylene (FEP).

38. The porous article of claim 37, wherein the FEP has a melt flow index (MFI) of less than 1.0 g/10 min when tested at 372 °C and 2.16 kg load.

39. The porous article of claim 26, wherein the coherent irregular network has a BET surface area of at least 0.35 m^2/g.

40. The porous article of claim 26, wherein the coherent irregular network has a BET surface area between 0.25 m^2/g and 5 m^2/g.

41. The porous article of claim 26, having a percent area shrinkage of less than 20%.

42. The porous article of claim 26, having a percent area shrinkage of less than 5%.

43. The porous article of claim 26, further comprising a hydrophilic coating on the porous ePTFE membrane or on the coherent irregular network and wherein the porous article is hydrophilic.

44. The porous article of claim 26, further comprising an oleophobic coating on the porous ePTFE membrane or on the coherent irregular network and wherein the porous article is oleophobic.

45. The porous article of claim 26, further comprising a support layer.

46. The porous article of claim 45, wherein the support layer is affixed to said coherent irregular network.

47. The porous article of claim 45, wherein the support layer is affixed to said porous expanded fluoropolymer membrane.

48. The porous article of claim 1, wherein said coherent irregular network and said porous ePTFE membrane have an attached area ratio between 0.05 to 0.25.

49. A porous article comprising:

a porous expanded fluoropolymer membrane; and

a coherent irregular network comprising particles of at least one thermoplastic polymer fused together;

wherein a surface of said porous expanded fluoropolymer membrane comprises at least one adjacent region at which said coherent irregular network is attached,

wherein the coherent irregular network is attached to said expanded fluoropolymer membrane at only a portion of the adjacent region,

wherein said coherent irregular network and said expanded fluoropolymer membrane have an attached area ratio between 0.05 to 0.25,

wherein said coherent irregular network comprises open areas,

wherein at least one of the open areas is greater than 100 μm in size, wherein the size of an open area is defined as the distance of the longest straight line that can be drawn across the open area,

wherein said at least one thermoplastic polymer is a thermoplastic fluoropolymer, and

wherein the particles of the at least one thermoplastic fluoropolymer have a melt flow index (MFI) between 0.3 g/10 min and 10g/10 min when tested at 372 °C and 2.16 kg load.

50. The porous article of claim 49, wherein the at least one thermoplastic polymer further comprises a first thermoplastic polymer and a second thermoplastic polymer.

51. The porous article of claim 50, wherein the first thermoplastic polymer has a lower melting point than the second thermoplastic polymer.

52. The porous article of claim 49, wherein the at least one thermoplastic polymer further comprises a plurality of thermoplastic polymers.

53. The porous article of claim 49, having a specific flow resistance of less than 2400 kPa s/m (krayls) and greater than 0.24 kPa s/m (krayls).

54. The porous article of claim 49, wherein said expanded fluoropolymer membrane is expanded polytetrafluoroethylene (ePTFE).

55. The porous article of claim 49, wherein the coherent irregular network comprises open areas.

56. The porous article of claim 55, wherein at least one of the open areas is greater than 100 μm in size.

57. The porous article of claim 49, wherein the coherent irregular network comprises bridging.

58. The porous article of claim 49, wherein the coherent irregular network is greater than 5 μm thick.

59. The porous article of claim 49, wherein the coherent irregular network is greater than 5 μm thick and less than 500 μm thick.

60. The porous article of claim 49, having a Sp value greater than 35 μm on at least one surface.

61. The porous article of claim 49, wherein the particles of the at least one thermoplastic fluoropolymer consist of fluorinated ethylene propylene (FEP).

62. The porous article of claim 61, wherein the FEP has a melt flow index (MFI) of less than 1.0 g/10 min when tested at 372 °C and 2.16 kg load.

63. The porous article of claim 49, wherein the coherent irregular network has a BET surface area of at least 0.35 m^2/g.

64. The porous article of claim 49, wherein the coherent irregular network has a BET surface area between 0.25 m^2/g and 5 m^2/g.

65. The porous article of claim 49, having a percent area shrinkage of less than 20%.

66. The porous article of claim 49, having a percent area shrinkage of less than 5%.

67. The porous article of claim 49, further comprising a hydrophilic coating on the porous ePTFE membrane or on the coherent irregular network and wherein the porous article is hydrophilic.

68. The porous article of claim 49, further comprising an oleophobic coating on the porous ePTFE membrane or on the coherent irregular network and wherein the porous article is oleophobic.

69. The porous article of claim 49, further comprising a support layer.

70. The porous article of claim 69, wherein the support layer is affixed to said coherent irregular network.

71. The porous article of claim 69, wherein the support layer is affixed to said porous expanded fluoropolymer membrane.