CLAIMS

1. A pair of eyeglasses, comprising:

a first ophthalmic lens mounted in eyeglass frames, the first ophthalmic lens comprising a first region and a second region surrounding the first region, the second region of the first ophthalmic lens comprising a plurality of spaced-apart light scattering centers and the first region of the first ophthalmic lens being free from light scattering centers; and

a second ophthalmic lens mounted in the eyeglass frames, the second ophthalmic lens comprising a first region and a second region surrounding the first region, the second region of the second ophthalmic lens comprising a plurality of spaced-apart light scattering centers and the first region of the second ophthalmic lens being free from light scattering centers,

wherein, the scattering centers of the first and second ophthalmic lenses have a maximum dimension in a range from 0.1 mm to 0.5 mm and are spaced apart by 0.8 mm or less, and for incident light transmitted by each ophthalmic lens, the ophthalmic lens scatters light incident on the light scattering centers.

2. The eyeglasses of claim 1, wherein each of the scattering centers has a maximum dimension of 0.2 mm or less.

3. The eyeglasses of claim 1, wherein each of the scattering centers is substantially the same size.

4. The eyeglasses of claim 1, wherein the scattering centers are spaced apart by 0.6 mm or less.

5. The eyeglasses of claim 1, wherein the scattering centers are spaced apart by 0.5 mm or less.

6. The eyeglasses of claim 1, wherein the scattering centers are spaced apart by 0.4 mm or less.

7. The eyeglasses of claim 1, wherein the scattering centers are spaced apart by 0.35 mm or less.

8. The eyeglasses of claim 1, wherein the scattering centers are arranged on a square grid.

9. The eyeglasses of claim 1, wherein the first regions of the first and second ophthalmic lenses have a maximum dimension of 2 mm or more.

10. The eyeglasses of claim 1, wherein the first regions of the first and second ophthalmic lenses have a maximum dimension of 3 mm or more.

11. The eyeglasses of claim 1, wherein the first regions of the first and second ophthalmic lenses have a maximum dimension of 4 mm or more.

12. The eyeglasses of claim 1, wherein the first regions of the first and second ophthalmic lenses have a maximum dimension of 5 mm or more.

13. The eyeglasses of claim 1, wherein the first regions of the first and second ophthalmic lenses have a maximum dimension of 6 mm or more.

14. The eyeglasses of claim 1, wherein the first regions of the first and second ophthalmic lenses have a maximum dimension of 7 mm or more.

15. The eyeglasses of claim 1, wherein the first regions of the first and second ophthalmic lenses have a maximum dimension of 8 mm or more.

16. The eyeglasses of claim 1, wherein the first regions of the first and second ophthalmic lenses are substantially circular.

17. The eyeglasses of claim 1, wherein the scattering centers are protrusions on a surface of the first and second ophthalmic lens.

18. The eyeglasses of claim 17, wherein the protrusions are formed from a transparent material.

19. The eyeglasses of claim 18, wherein the transparent material is clear.

20. The eyeglasses of claim 18, wherein the transparent material is tinted.

21. The eyeglasses of claim 18, wherein the transparent material has substantially the same refractive index as a lens material.

22. The eyeglasses of claim 17, wherein the protrusions are substantially spherical.

23. The eyeglasses of claim 1, wherein the dots are recesses on a surface of the corresponding lens.

24. The eyeglasses of claim 1, wherein the dots are inclusions between opposing surfaces of each lens.

25. The eyeglasses of claim 1, wherein the lenses are clear lenses.

26. The eyeglasses of claim 1, wherein the eyeglasses are tinted eyeglasses.

27. The eyeglasses of claim 1, wherein the plurality of scattering centers reduces an image contrast of an object viewed through the plurality of scattering centers by at least 30% compared to an image contrast of the object viewed through the first regions of the first and second ophthalmic lenses.

28. The eyeglasses of claim 1, wherein the plurality of scattering centers reduces an image contrast of an object viewed through the plurality of scattering centers by at least 35% compared to an image contrast of the object viewed through the first regions of the first and second ophthalmic lenses.

29. The eyeglasses of claim 1, wherein the plurality of scattering centers reduces an image contrast of an object viewed through the plurality of scattering centers by at least 40% compared to an image contrast of the object viewed through the first regions of the first and second ophthalmic lenses.

30. The eyeglasses of claim 1, wherein the plurality of scattering centers reduces an image contrast of an object viewed through the plurality of scattering centers by at least 45%

compared to an image contrast of the object viewed through the first regions of the first and second ophthalmic lenses.

31. The eyeglasses of claim 1, wherein the plurality of scattering centers reduces an image contrast of an object viewed through the plurality of scattering centers by at least 50% compared to an image contrast of the object viewed through the first regions of the first and second ophthalmic lenses.

32. The eyeglasses of claim 1, wherein the plurality of scattering centers reduces an image contrast of an object viewed through the plurality of scattering centers by at least 55% compared to an image contrast of the object viewed through the first regions of the first and second ophthalmic lenses.

33. The eyeglasses of claim 1, wherein the plurality of scattering centers reduces an image contrast of an object viewed through the plurality of scattering centers by at least 60% compared to an image contrast of the object viewed through the first regions of the first and second ophthalmic lenses.

34. The eyeglasses of claim 1, wherein the first and second ophthalmic lenses having optical power to correct a wearer's on-axis vision to 20/20 or better through the first regions of the first and second ophthalmic lenses, and, for at least a portion of the wearer's peripheral vision through the scattering centers, the first and second ophthalmic lenses correct the wearer's vision to 20/25 or better.

35. A method of making the eyeglasses of claim 1, comprising:

depositing discrete portions of a material on a surface of the first and second ophthalmic lens corresponding to the second region of the first and second ophthalmic lens; and

curing the deposited material to provide protrusions on the first and second ophthalmic lens surface forming the light scattering centers.

36. The method of claim 35, wherein the material is deposited using an inkjet printer.

37. The method of claim 35, wherein the deposited material is cured using radiation.

38. The method of claim 37, wherein the radiation comprises ultraviolet radiation.

39. A pair of eyeglasses customized for a wearer, comprising:

a first ophthalmic lens mounted in eyeglass frames, the first ophthalmic lens comprising a first region and a second region surrounding the first region, the second region of the first ophthalmic lens comprising a plurality of spaced-apart light scattering centers and the first region of the first ophthalmic lens being free from light scattering centers; and

a second ophthalmic lens mounted in the eyeglass frames, the second ophthalmic lens comprising a first region and a second region surrounding the first region, the second region of the second ophthalmic lens comprising a plurality of spaced-apart light scattering centers and the first region of the second ophthalmic lens being free from light scattering centers,

wherein, the scattering centers of the first and second ophthalmic lenses have a maximum dimension in a range from 0.1 mm to 0.5 mm and are spaced apart by 0.8 mm or less, and for incident light transmitted by each ophthalmic lens, the ophthalmic lens scatters light incident on the light scattering centers,

wherein the first and second ophthalmic lenses have optical power to correct a wearer's on-axis vision to 20/20 or better,

wherein the plurality of scattering centers comprising an array of scattering centers arranged so that, for at least a portion of the wearer's peripheral vision, the first and second ophthalmic lenses correct the wearer's vision to 20/25 or better and reduce an image contrast by at least 30% compared to on-axis image contrast.

40. A pair of eyeglasses customized for a wearer, comprising:

a first ophthalmic lens mounted in eyeglass frames, the first ophthalmic lens comprising a first region and a second region surrounding the first region, the second region of the first ophthalmic lens comprising an optical diffuser and the first region of the first ophthalmic lens being free from light scattering centers; and

a second ophthalmic lens mounted in the eyeglass frames, the second ophthalmic lens comprising a first region and a second region surrounding the first region, the second region of the second ophthalmic lens comprising an optical diffuser and the first region of the second ophthalmic lens being free from light scattering centers.

41. The eyeglasses of claim 40, wherein the optical diffuser comprises a film laminated on a surface of the first and second ophthalmic lens.

42. The eyeglasses of claim 40, wherein the first and second ophthalmic lenses each have a maximum dimension of more than 1 mm, the first region of the first and second ophthalmic lenses being aligned with a viewing axis of a wearer of the pair of eyeglasses.

43. An ophthalmic lens, comprising:

two opposing curved surfaces collectively having an optical power to correct a wearer's on-axis vision to 20/20 or better; and

a plurality of scattering centers distributed across each lens, the plurality of scattering centers comprising an array of spaced apart scattering centers arranged so that, for at least a portion of the wearer's peripheral vision, the lenses correct the wearer's vision to 20/25 or better and reduce an image contrast by at least 30% compared to on-axis image contrast, the plurality of scattering centers including a first region free of scattering centers aligned with a viewing axis of the wearer.

44. The ophthalmic lens of claim 43, wherein the ophthalmic lens is an eyeglass lens.

45. The ophthalmic lens of claim 43, wherein the ophthalmic lens is a contact lens.

46. A contact lens, comprising:

two opposing curved surfaces collectively having an optical power to improve a wearer's on-axis vision, the curved surfaces defining a lens axis; and

at least one of the curved surfaces comprising a first region surrounded by a second region, the second region having a first annular region and a second annular region extending from the first annular region to an edge of the contact lens, wherein:

the first region, and the first and second annular regions are substantially centered on the lens axis, and

the first annular region has a plurality of spaced apart depressions sized and shaped so that they reduce an image contrast for the wearer compared to the wearer's on-axis image contrast.

47. The contact lens of claim 46, wherein the first region has a diameter in a range from about 0.5 mm to about 2 mm.

48. The contact lens of claim 47, wherein the first region has a diameter in a range from about 0.5 mm to about 1.5 mm.

49. The contact lens of claim 48, wherein the first region has a diameter in a range from about 0.5 mm to about 1.2 mm.

50. The contact lens of claim 46, wherein the first annular region has an outer diameter in a range from about 2.5 mm to about 10 mm.

51. The contact lens of claim 50, wherein the outer diameter of the first annular region is in a range from about 2.5 mm to about 8 mm.

52. The contact lens of claim 51, wherein the outer diameter of the first annular region is in a range from about 2.5 mm to about 6 mm.

53. The contact lens of claim 52, wherein the outer diameter of the first annular region is in a range from about 2.5 mm to about 5 mm.

54. The contact lens of claim 51, wherein the outer diameter of the first annular region is in a range from about 2.5 mm to about 4 mm.

55. The contact lens of claim 52, wherein the outer diameter of the first annular region is about 3 mm.

56. The contact lens of claim 46, wherein the second annular region has a radial dimension of at least 1 mm.

57. The contact lens of claim 56, wherein the radial dimension of the second annular region is about 2 mm or more.

58. The contact lens of claim 57, wherein the radial dimension of the second annular region is about 3 mm or more.

59. The contact lens of claim 56, wherein the radial dimension of the second annular region is about 5 mm or less.

60. The contact lens of claim 59, wherein the radial dimension of the second annular region is about 4 mm or less.

61. The contact lens of claim 46, wherein depressions have a maximum lateral dimension in a range from 0.1 mm to about 0.5 mm.

62. The contact lens of claim 46, wherein the depressions occupy at least 10% of an area of the first annular region.

63. The contact lens of claim 62, wherein the depressions occupy at least 20% of the area of the first annular region.

64. The contact lens of claim 63, wherein the depressions occupy at least 30% of the area of the first annular region.

65. The contact lens of claim 64, wherein the depressions occupy at least 40% of the area of the first annular region.

66. The contact lens of claim 62, wherein the depressions occupy 70% or less of the area of the first annular region.

67. The contact lens of claim 66, wherein the depressions occupy 60% or less of the area of the first annular region.

68. The contact lens of claim 67, wherein the depressions occupy 50% or less of the area of the first annular region.

69. The contact lens of claim 46, wherein each of the depressions is substantially the same size.

70. The contact lens of claim 46, wherein at least some of the depressions have different sizes.

71. The contact lens of claim 46, wherein each depression is separated from its adjacent depression by substantially the same distance.

72. The contact lens of claim 46, wherein a distance between adjacent depressions varies.

73. A method, comprising:

exposing a contact lens to laser radiation to form a plurality of depressions in a surface of the contact lens.

74. The method of claim 73, wherein the laser is an infrared laser.

75. The method of claim 73, wherein the laser is a CO2 laser.

76. The method of claim 73, wherein the contact lens is exposed to pulsed laser radiation to form the depressions.

77. The method of claim 73, wherein the laser has a power in a range from 0.5W to 60W.

78. The method of claim 73, wherein the contact lens and a beam of the laser radiation are moved relative to each other to expose different parts of the contact lens surface to the laser radiation.

79. The method of claim 73, wherein the laser radiation is focused to a spot size of about 0.1 mm or less during the exposing.

80. The method of claim 79, wherein the laser radiation is focused to a spot size of about 0.05 mm or less during the exposing.

81. The method of claim 80, wherein the laser radiation is focused to a spot size of about 0.025 mm during the exposing.

82. The method of claim 73, wherein the contact lens is exposed so that each of the plurality of depressions is formed from a corresponding discrete exposure of the same duration, the same energy, and the same spot size.

83. The method of claim 73, wherein the contact lens is exposed so that each of the plurality of depressions is formed from corresponding a discrete exposure, wherein at least the duration, energy, or spot size is varied for different ones of the discrete exposures.

84. The method of claim 73, wherein the exposed surface is a convex surface.

85. The eyeglasses of claim 1, wherein the scattering centers are arranged in a semi-random or random pattern.

86. The eyeglasses of claim 1, wherein the scattering centers are arranged on a non-regular array.

87. The method of claim 35, wherein the material is arranged in a semi-random or random pattern.

88. The method of claim 35, wherein the material is arranged on a non-regular array.

89. The eyeglasses of claim 39, wherein the scattering centers are arranged in a semi-random or random pattern.

90. The eyeglasses of claim 39, wherein the scattering centers are arranged on a non-regular array.

91. The contact lens of claim 46, wherein the depressions are arranged in a semi-random or random pattern.

92. The contact lens of claim 46, wherein the depressions are arranged on a non-regular array.

93. The method of claim 73, wherein the depressions are arranged in a semi-random or random pattern.

94. The method of claim 73, wherein the depressions are arranged on a non-regular array.

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