Claims

1. A film for applying to an ophthalmic lens, wherein the film has a base refractive index and includes a plurality of gradient index optical elements that are distributed across an area of the film, wherein each gradient index optical element is a lens, each gradient index optical element has a volume of between 100 μm^3 and 3 mm^3, and each gradient index optical element has a radial variation in refractive index or a transverse variation in refractive index across the element.

2. The film according to claim 1, wherein the plurality of gradient index optical elements are distributed on lattice points of a triangular lattice.

3. The film according to claim 1, wherein each of the at least one gradient index optical element is a photocured optical element.

4. The film according to claim 1, wherein each of the at least one gradient index optical element has a varying refractive index defined by a quadratic profile.

5. The film according to claim 1, wherein the plurality of the gradient index optical elements occupy between 20% and 80% of a surface area of the film.

6. The film according to claim 1, comprising a central region, and an annular region surrounding the central region, wherein the annular region includes the at least one gradient index optical element.

7. The film according to claim 6, wherein a plurality of the at least one gradient index optical element is arranged periodically around the annular region.

8. The film according to claim 6, including a plurality of concentric annular regions, each annular region including at least one gradient index annular optical element.

9. The film according to claim 8, wherein at least one gradient index optical element in a first annular region is out of phase with at least one gradient index optical element in an adjacent second annular region.

10. The film according to claim 8, wherein the concentric annular regions are radially separated by a region of the layer having the base refractive power.

11. The film according to claim 8, wherein the concentric annular regions are adjacent to each other.

12. The film according to claim 1, wherein each of the at least one gradient index optical element has a diameter or width of between 10 µm and 2 mm.

13. The film according to claim 1, having a thickness of between 1 µm and 70 µm.

14. The film according to claim 1, further comprising an adhesive surface for adhering the film to the surface of an ophthalmic lens.

15. The film according to claim 1, further comprising a substrate configured to provide a protective layer when the film is applied to a surface of an ophthalmic lens.

16. An ophthalmic lens comprising the film of claim 1.

17. The ophthalmic lens of claim 16, which is a spectacle lens.

18. The ophthalmic lens of claim 16, which is a contact lens.

19. Spectacles, comprising the ophthalmic lens of claim 17.