CLAIMS

1. An electrically-switchable flexible contact lens for conforming to an eye of a user, the lens comprising:

   a first liquid crystal cell for changing a focal power of the contact lens, and having a cell gap thickness between a first inner surface and a second inner surface,

   the first liquid crystal cell comprising a diffractive optical element for correcting the vision of a user,

   wherein the diffractive optical element is arranged to maintain the cell gap thickness by providing support at one or more locations within the cell; and

   the diffractive optical element comprises an inner portion and an outer portion, a maximum height of the diffractive optical element at the outer portion being greater than a maximum height of the diffractive optical element at the inner portion such that the diffractive optical element at the outer portion provides support to and spaces the first inner surface and the second inner surface at a greater distance at an outer region of the first liquid crystal cell than an inner region of the first liquid crystal cell.

2. The electrically-switchable flexible contact lens of claim 1, further comprising a perimeter spacer provided at the perimeter of the first liquid crystal cell for maintaining the cell gap thickness in addition to the diffractive optical element.
3. The electrically-switchable flexible contact lens of claim 1, wherein the first liquid crystal cell comprises a cholesteric liquid crystal, and the first liquid crystal cell is operable between a first, unswitched state and a second, switched state, wherein in one of the first and second states, the difference in the effective refractive index of the liquid crystal and the refractive index of the diffractive optical element is greater than in the other of the first and second states.
4. The electrically-switchable flexible contact lens of claim 3, wherein in the other of the first and second states, the difference in the effective refractive index of the liquid crystal and the refractive index of the diffractive optical element is approximately nil.
5. The electrically-switchable flexible contact lens of claim 1, wherein at least a portion of the diffractive optical element is attached to the first inner surface and at least a portion of the diffractive optical element may be attached to the second inner surface.

6. The electrically-switchable flexible contact lens of claim 1, wherein at both 450 nm and 700 nm, the average refractive index of the liquid crystal is 0.80 to 1.20 times the refractive index of the diffractive optical element, the average refractive index being $n_{ave}=0.5(n_e+n_o)$, where n_e is the extraordinary refractive index and n_o is the ordinary refractive index.
7. The electrically-switchable flexible contact lens of claim 6, wherein at both 450 nm and 700 nm, said average refractive index of the liquid crystal is 0.95 to 1.05 times the refractive index of the diffractive optical element.
8. The electrically-switchable flexible contact lens of claim 1 further comprising a second liquid crystal cell for changing a focal power of the contact lens, the second liquid crystal cell optionally comprising the features of the first liquid crystal cell.
9. The electrically-switchable flexible contact lens of claim 1, wherein the maximum height of the diffractive optical element at the outer portion is from 1% to 20% greater than the maximum height of the diffractive optical element at the inner portion.
10. The electrically-switchable flexible contact lens of claim 9, wherein the maximum height of the diffractive optical element at the outer portion is at least 3% greater and up to 15% greater than the maximum height of the diffractive optical element at the inner portion.
11. The electrically-switchable flexible contact lens of claim 10, wherein the liquid crystal comprises a cholesteric liquid crystal, and optionally, in an unswitched state, a director of the liquid crystal may be at an angle of no more than 5 degrees to the first and second inner surfaces, and in a switch stated, a director of the liquid crystal may be at an angle of at least 60 degrees, optionally at least 70 degrees, optionally at least 80 degrees and optionally at least 85 degrees to the first and second inner surfaces.
12. The electrically-switchable flexible contact lens of claim 9, wherein the diffractive optical element comprises a plurality of peaks and troughs, and the outer portion comprises an outer peak, optionally the outermost peak.
13. The electrically-switchable flexible contact lens of any of claim 9, wherein the diffractive optical element extends over a chord length, r, the inner portion comprises the portion of diffractive optical element within a cord length of r/8 from a centre of the diffractive optical element, and the outer portion comprises the portion of diffractive optical element having a chord length of from 3r/8 to r/2.