CLAIMS

1. A contact lens comprising:

a hydrogel skirt, wherein the hydrogel skirt is molded into a shape of the contact lens, with an arcuate back surface placed proximate to a user's cornea during a use of the contact lens;

an insert, wherein the insert is gas impermeable and impermeable to fluid flow through its body, wherein the insert is encapsulated within the hydrogel skirt,

the encapsulated insert comprising a dual chamber structure with spacers that determine the height of each chamber in the dual chamber structure, the spacers being 100 microns or less in diameter; and wherein the insert comprises one or more components mounted thereupon;

a first region of the hydrogel skirt, wherein the first region of the hydrogel skirt is that portion of the hydrogel skirt that is between a surface of the insert and a cornea of a user during the use of the contact lens; and

a means within the contact lens of enhancing oxygen levels within a fluid in contact with the first region comprising a first laser cut pore in the insert traversing at least one of the spacers, the first laser cut pore having a diameter of between 10 and 20 microns and positioned to be in a fluid contact with the first region.

2. The contact lens according to Claim 1, wherein the laser cut pore is back-filled with a silicone containing material.

3. The contact lens according to Claim 1, wherein the first laser cut pore is one of a plurality of laser cut pores, wherein the plurality of laser cut pores traverse the body of the insert.

4. The contact lens according to Claim 3, wherein the plurality of laser cut pores are back-filled with the silicone containing material.

5. The contact lens according to Claim 1, wherein the means within the contact lens of enhancing oxygen levels comprises a layer of absorptive material, wherein the absorptive material absorbs oxygen gas.

6. The contact lens according to Claim 5, wherein the absorptive material comprises hemoglobin.

7. The contact lens according to Claim 5, wherein the absorptive material comprises hemocyanin.

8. The contact lens according to Claim 5, wherein the absorptive material comprises a porphyrin based material.

9. The contact lens according to Claim 5, wherein the absorptive material comprises a metal organic framework molecular species.

10. The contact lens according to Claim 1, wherein the means within the contact lens of enhancing oxygen levels comprises an embedded electroactive releasing structure, wherein oxygen stored in a vessel is released upon an electrical signal.

11. The contact lens according to Claim 10, wherein the electrical signal causes an electrical current to melt a cover of a metallic foil.

12. The contact lens according to Claim 1, wherein the means within the contact lens of enhancing oxygen levels comprises an electroactive oxygen generator.

13. The contact lens according to Claim 12, wherein an electrical signal causes the electroactive oxygen generator to release a fluid comprising an oxygen containing chemical to interact with a catalytic surface to evolve oxygen gas.

14. The contact lens according to Claim 13, wherein the electroactive oxygen generator comprises hydrogen peroxide.

15. The contact lens according to Claim 14, wherein the electrical signal causes an electrical current to melt a metallic foil layer.

16. The contact lens according to Claim 1, wherein the means within the contact lens of enhancing oxygen levels comprises a pump, wherein the pump causes a movement of tear fluid proximate to the first region of the hydrogel skirt.

17. The contact lens according to Claim 16, wherein the tear fluid moves in channels formed within the hydrogel skirt.

18. The contact lens according to Claim 17, wherein the channels are shaped to favor a first direction of flow through the channels.

19. The contact lens according to Claim 18, wherein the pump comprises an electroactive element.

20. The contact lens according to Claim 19, wherein the electroactive element comprises one or more of a piezoelectric based transducer or an electroactive polymer based transducer.

21. The contact lens according to Claim 18, wherein the pump comprises a raised portion of hydrogel skirt material that interacts with a user's eyelid for engagement of a pumping action.

22. The contact lens according to Claim 16, wherein the pump comprises a raised portion of hydrogel skirt material that interacts with a user's eyelid for engagement of a pumping action.