

Contact Lens Case

Technical Field

The present invention generally relates to a contact
5 lens case, a method of manufacturing the contact lens case
and use of the same.

Background

Like all synthetic materials, contact lenses are
10 subject to deposits. These deposits and absorbed materials
can build up on the lens surface which over time may
result in the reduction of comfort and vision as well as
an increased risk of contamination. This is why lenses
need to be cleaned on a regular basis using various types
15 of cleaning solutions, which are not only compatible with
the lens materials but also with the eye. The cleaning
solutions alone are often found to be insufficient to
prevent formation of biofilms. Therefore, contact lenses
are often disinfected using hydrogen peroxide and chemical
20 neutralizers to prevent biofilm formation. However, traces
of hydrogen peroxide left on the lens during the
disinfection may cause irritation of and may be harmful to
the eyes.

Therefore, there is a need to provide a contact lens
25 case and contact lens cleaning system that will prevent
the formation of biofilms on the surface of contact
lenses.

Summary of Invention

30 According to a first aspect of the invention, there is
provided a contact lens case comprising:

at least one contact lens enclosure for containing a
cleaning solution therein;

a power source recess for allowing a removable power source to be provided therein; and

at least two electrodes extending from the power source recess to the at least one contact lens enclosure.

5 Advantageously, in use the electrodes are capable of applying an electric field to the cleaning solution when the removable power source is provided in the power source recess. In use, the electric field may kill one or more microorganisms present in the biofilm.

10 According to a second aspect of the invention, there is provided a method of preventing biofilm formation on the surface of a contact lens using a contact lens case comprising at least one contact lens enclosure for containing a cleaning solution therein; a power source
15 recess for allowing a removable power source to be provided therein; and at least two electrodes extending from the power source recess to the at least one contact lens enclosure, the method comprising the steps of:

providing a cleaning solution in the contact lens
20 enclosure;

locating the contact lens in the cleaning solution;
and

applying an electric field to the solution to at least partially prevent the formation of biofilm on the
25 contact lens.

According to a third aspect of the invention, there is provided a method of manufacturing a contact lens case, the method comprising the step of:

placing a mold forming material in a mold, the mold
30 having a defined shape to form a contact lens case comprising: at least one contact lens enclosure for containing a cleaning solution therein; a power source recess for allowing a removable power source to be provided therein; and at least two electrode recesses

extending from the power source recess to the at least one contact lens enclosure for locating electrodes therein.

In one embodiment, the method of manufacturing a contact lens case further comprises the step of:

- 5 placing electrodes in each of the at least two electrode recesses.

According to a fourth aspect of the invention, there is provided a contact lens case comprising:

- at least one contact lens enclosure for containing a
10 cleaning solution therein;

a power source; and

- at least two electrodes extending from the power source to the at least one contact lens enclosure, wherein the formation of an electric circuit across the electrodes
15 is controlled by the presence or absence of cleaning solution in the at least one contact lens enclosure.

According to a fifth aspect of the invention, there is provided a contact lens kit comprising:

- a contact lens case comprising at least one contact
20 lens enclosure for containing a cleaning solution therein;

a power source recess for allowing a removable power source to be provided therein; and

- at least two electrodes extending from the power source recess to the at least one contact lens enclosure;
25 and

instructions for using the contact lens cleaning case to at least partially prevent the formation of biofilm on the contact lens.

According to a sixth aspect of the invention, there is provided a contact lens case comprising:

- at least one contact lens enclosure for containing a cleaning solution therein, the enclosure having an opening;

a cap capable of releasable attachment to the enclosure for covering the opening;

a power source; and

at least two electrodes extending from the power
5 source to the at least one contact lens enclosure, wherein the formation of an electric circuit across the electrodes is controlled by attachment of the cap on the enclosure and detachment of the cap off the enclosure.

10

Definitions

The following words and terms used herein shall have the meaning indicated:

Unless specified otherwise, the terms "comprising" and "comprise", and grammatical variants thereof, are
15 intended to represent "open" or "inclusive" language such that they include recited elements but also permit inclusion of additional, un-recited elements.

The term "biofilm" as used herein, is intended to include biological films that develop and persist at
20 interfaces in aqueous environments. Biofilms are composed of microorganisms embedded in an organic gelatinous structure composed of one or more matrix polymers which are secreted by the resident microorganisms. The language "biofilm development" or "biofilm formation" is intended
25 to include the formation, growth, and modification of the bacterial colonies contained with the biofilm structures. The microorganisms that form biofilms may be, single or multiple species, that grow attached to a surface and produce a slime layer that provides a protective
30 environment, see for example Costerton, J. W. (1995) *J Ind Microbiol.* 15(3):137-40, Costerton, J. W. et al (1995) *Annu Rev Microbiol.* 49:711-45). Exemplary microorganisms that may form biofilms include, *P. aeruginosa*, *Klebsiella pneumoniae*, *E. coli* and *Staphylococcus epidermidis*.

The term "cleaning solution" refers to an aqueous solution suitable for cleaning and/or storing contact lenses that is preferably sterile and inert to a contact lens.

5 The term "prevent the formation of biofilm" means to prevent the attachment of the biofilm forming microorganisms on the surface of a contact lens and it may also mean preventing the propagation, and/or reducing, the population of biofilm forming microorganisms, which may
10 include killing the microorganisms and/or inhibiting the propagation of the microorganisms.

 As used herein, the term "about", in the context of concentrations of components of the formulations, typically means $\pm 5\%$ of the stated value, more typically
15 $\pm 4\%$ of the stated value, more typically $\pm 3\%$ of the stated value, more typically, $\pm 2\%$ of the stated value, even more typically $\pm 1\%$ of the stated value, and even more typically $\pm 0.5\%$ of the stated value. Throughout this disclosure, certain embodiments may be disclosed in a
20 range format. It should be understood that the description in range format is merely for convenience and brevity and should not be construed as an inflexible limitation on the scope of the disclosed ranges. Accordingly, the description of a range should be considered to have
25 specifically disclosed all the possible sub-ranges as well as individual numerical values within that range. For example, description of a range such as from 1 to 6 should be considered to have specifically disclosed sub-ranges such as from 1 to 3, from 1 to 4, from 1 to 5, from 2 to
30 4, from 2 to 6, from 3 to 6 etc., as well as individual numbers within that range, for example, 1, 2, 3, 4, 5, and 6. This applies regardless of the breadth of the range.

Detailed Disclosure of Embodiments

Exemplary, non-limiting embodiments of a contact lens case will now be disclosed.

5 There is provided a contact lens case comprising at least one contact lens enclosure for containing a cleaning solution; a power source recess for allowing a removable power source to be provided therein; and a pair of electrodes connected to the removable power source and
10 extending into at least one contact lens holder, wherein the pair of electrodes are capable of applying an electric field to the cleaning solution.

Contact lens enclosure

15 The contact lens case may be provided with at least one contact lens enclosure for containing a cleaning solution. The contact lens enclosure may be any size chamber such that it is capable of holding a sufficient amount of a cleaning solution to completely submerge a
20 contact lens.

The contact lens case may contain multiple enclosures for storing multiple contact lenses. More than one contact lens may also be located in one enclosure chamber.

25 The contact lens enclosure may be composed of a sterile material that is inert to the cleaning solution and the contact lens. The contact lens enclosure may be composed of a material selected from the group consisting of polyethylene terephthalate, high-density polyethylene, poly-vinyl Chloride, low-density polyethylene, polypropylene, polystyrene and a blend thereof. In one
30 embodiment the contact lens holder is prepared from polyethylene terephthalate.

The contact lens case may comprise a locator for locating a contact lens in position within the enclosure relative to the electrodes.

5 The inner surface of a contact lens enclosure may be chemically treated or mechanically polished so as to make the surface inert and non-adherent to the contact lens. The enclosure chamber of the contact lens case may be PTFE (Polytetra fluroethylene) coated to provide chemical inertness and non-adhesiveness.

10 The enclosure chamber of the contact lens holder may be any suitable shape selected from the group, when viewed from a top view, consisting of semi-spherical, cylindrical, rectangular and cubical. In one embodiment the enclosure chamber of the contact lens case is semi-spherical when viewed from a top view. The semispherical enclosure chamber advantageously provides ease of locating
15 a contact lens in a cleaning solution. In another embodiment, the chamber enclosure of the contact lens holder is cylindrical.

20 The contact lens enclosure may be provided with at least two electrode recesses.

In one embodiment, the enclosure includes an opening having connecting formations surrounding the opening. The connecting formations are capable of mating with
25 corresponding connecting formations on a cap. The cap is capable of covering the opening when it is attached to the enclosure. In one embodiment, at least one of the said electrodes extends through the body of the cap for coupling with the power source. The electrode extending
30 through the cap is capable of electrically coupling to an electrode provided in the enclosure. In use, when solution is provided in the enclosure and is in contact with said at least two electrodes provided in the enclosure, an electric circuit forms and an electric field

is imparted to the solution. Accordingly, it will be appreciated that in this embodiment, the cap may form a switch to turn the electric field on and off.

5 **Electrodes**

The contact lens cleaning case is provided with at least two electrodes extending from the power source recess to the at least one contact lens enclosure, wherein the electrodes are capable of applying an electric field
10 to the cleaning solution when the removable power source is provided in the power source recess.

The contact lens cleaning case may be provided with more than two electrodes. In one embodiment the contact lens cleaning case is provided with two electrodes.

15 The electrodes may be located in the electrode recess provided in the contact lens enclosure.

The electrodes may be composed of a material that is capable of carrying electric charge and is inert to the cleaning solution. The electrode may be a metal or a metal
20 alloy. The electrode may be selected from the group consisting of copper electrodes, aluminum electrodes, gold electrodes, silver electrodes, platinum electrodes, palladium electrodes, ferrous alloy electrodes, nickel alloy electrodes, copper alloy electrodes, stainless steel
25 electrodes, and electrodes of alloys thereof. In one embodiment, the contact lens cleaning case is provided with platinum electrodes.

The electrode may have a shape of plate, rod or coil. In one embodiment the contact lens cleaning case is
30 provided with plate shaped electrodes.

Cleaning solution

The chamber enclosure of a contact lens case may contain a cleaning solution in use. A contact lens may be

located in the cleaning solution. The cleaning solution may be any electrically conductive medium that is sterile and inert to a contact lens. In one embodiment, the cleaning solution may be any common liquid such as water
5 or saline. The commercially available contact lens cleaning solutions such as those provided by Barnes Hind Inc. of Sunnyvale, California, United States of America, Blairex Laboratories of Columbus, Indiana, United States of America, CIBA Vision Corp. of Gorgia, United States of
10 America, Bausch & Lomb Inc. of Rocherster, New York, United states of America may also be used as a cleaning solution.

The contact lens cleaning case may prevent biofilm formation on the surface of a contact lens submerged in a
15 cleaning solution when a power source is provided in the power source recess. The contact lens cleaning case may prevent the formation of a biofilm without using a harsh chemical like hydrogen peroxide.

20 **Power source recess and Power source**

The contact lens cleaning case is provided with a recess for locating a removable power source. The removable power source may be any commonly used power source such as a chemical battery, which may be disposable
25 or it may be rechargeable.

In one embodiment, the power source is not removable. For example, the contact lens case may be disposable and the case will be discarded once the battery is exhausted. Alternatively, a non-chemical power source might be used,
30 such as a solar panel that is mounted on, or in the recess of, the contact lens case.

The removable power source may comprise more than one chemical battery. The removable power source may be selected from the group consisting of AA type, AAA type,

LR44, CR type and PP3 type chemical batteries. In one embodiment, the removable power source is a LR44 type chemical battery.

5 In yet another embodiment, the power source may not be removable but may be connected to a fixed power source such as a household power supply or even connected to a car battery via a suitable outlet on the automobile such as a cigarette lighter outlet.

10 The electrodes may apply an electric field to the cleaning solution when a removable power source is located in the power source recess and a cleaning solution is provided in the contact lens enclosure. The strength of the electric field may depend on the voltage applied across the electrodes. The voltage applied across the
15 electrodes may be in a range selected from the group consisting of about 0.1V to about 6.0V, about 0.5V to about 5.5V, about 1V to about 5V, about 1.5V to about 4.5 V, about 1.5 to about 3.0 V, about 3.0 to about 4.5V. In one embodiment, the voltage applied across the electrodes
20 may be in the range of about 1.5V to about 3.0V.

The strength of the electric field may be regulated through a voltage regulator that may be connected between the power source and the electrodes.

25 The strength of electric field and duration of its application may be suitably selected depending upon the nature of the biofilm.

A contact lens may be located in a contact lens cleaning case provided with a cleaning solution and a power source for a suitable duration in a range selected
30 from the group consisting of about 1 to about 24 hours, about 2 to about 20 hours, about 3 to about 16 hrs, about 4 to about 14 hours, about 5 to about 12 hours and about 6 to about 12 hours. In one embodiment, a contact lens is

located in a contact lens cleaning case for a duration of about 14 hours.

5 A contact lens may be stored in a contact lens cleaning case provided with a cleaning solution and a power source for a longer duration in a range selected from the group consisting of 1 to 30 days, 7 to 21 days, 14 to 18 days. In one embodiment, a contact lens is located in a contact lens cleaning case for a duration of about 3 days.

10 A contact lens may be stored in a contact lens cleaning case provided with a cleaning solution and a power source for a even longer duration in a range selected from the group consisting of 1 to 12 months, 3 to 10 month, 5 to 8 months and 6 to 7 months.

15 One of the advantages provided by disclosed embodiments is that there is no need to provide an on/off switch. The formation of an electric circuit across the electrodes is controlled by the presence of absence of a cleaning solution in the contact lens enclosure. In yet
20 another embodiment, the electric circuit may be turned on by attachment of the cap on the enclosure and turned off by detachment of the cap off the enclosure.

The electrodes may be extended up to the removable battery source through wires that are capable of
25 conducting electric current. The wires may be composed of a metal or alloy selected from the group consisting of copper, aluminum, silver, gold, platinum, nickel, iron, ferrous alloys, copper alloys, stainless steel and alloys thereof. In one embodiment, the electrodes are connected
30 to a power source by using copper wires.

Brief Description Of Drawings

The accompanying drawings illustrate a disclosed embodiment and serve to explain the principles of the

disclosed embodiment. It is to be understood, however, that the drawings are designed for purposes of illustration only, and not as a definition of the limits of the invention.

5 **Fig. 1** is a cross-section front view of a first disclosed embodiment of a contact lens case;

Fig 2 is a cross-section front view of a second disclosed embodiment of a contact lens case; and

Fig 3 is a cross-section front view of a third
10 disclosed embodiment of a contact lens case.

Detailed Description

Embodiment 1

Referring to Fig. 1, there is shown a cross-section
15 front view of a contact lens cleaning case 1. The case 1 has two contact lens enclosures in the form of two semi-spherical cavities 4 and 5. In use, the cavities 4 and 5 contain a cleaning solution.

The contact lens case 1 has a platform 10 connecting
20 the two semi-spherical cavities 4,5. The platform 10 is provided with a power source recess 14 in which a battery 8 resides in use.

Two sets of electrode pairs in the form of wires
 (16A,16B,16C,16D) extend from the cavities (4,5) to the
25 recess of the battery 8. The wires are made of copper. The ends of the wires (16A,16B,16C,16D) are in direct contact with the battery 8, while the opposite ends of the wires (16A,16B,16C,16D) are respectively connected to platinum
 plates (15A,15B,15C,15D). The platinum plates (15A,15B)
30 extend into the chamber 4 and are oppositely located around the periphery of the inner surface of the chamber 4. The platinum plates (15C,15D) extend into the chamber 5

and are oppositely located around the periphery of the inner surface of the chamber 5.

In use, a contact lens is located in the chamber enclosure 4 or 5 containing a cleaning solution. An electric field is applied to the cleaning solution by providing a battery 8 in the power source recess 14. The electric field is applied when an electric circuit is created when sufficient cleaning solution is present in the cavities (4,5) to make contact with both of the electrode pairs (15A,15B) and (15C,15D). When solution is removed from the cavities (4,5), the electric circuit is broken and the electric field is not formed. Accordingly, there is no need to provide a switching mechanism to turn the electric field on or off.

The case 1 is made from polyethylene terephthalate by injection molding, which is well known to those skilled in the art. The mould has a defined shape to form the structure shown in Fig. 1 and as described above, with recesses for location of the wires (16A,16B,16C,16D). Once the case 1 has been formed, the wires (16A,16B,16C,16D) are inserted into the recesses and the platinum electrode pads (15A,15B,15C,15D) are soldered thereon.

Embodiment 2

Referring to Fig. 2, there is shown a cross-sectional front view of a contact lens cleaning case 50. The case 50 has a cylindrical body 22 and forms a cylindrical chamber 23. In use, the chamber 23 contains a cleaning solution.

The chamber 23 is provided with a platinum electrode pad 28 at the bottom corner of the cylindrical body 22.

The cylindrical body 22 has a detachable cap 36 mounted on its top, and has spiral engaging surfaces for allowing the cap 36 to be screwed onto and off the top of

the cylindrical body 22 by corresponding grooves (not shown) on the outer side edge of the cylindrical body 22 thereon. The case 50 also comprises a centrally located rod 38 that extends from the cap 36 toward the bottom of the chamber 23. Two perforated chambers 24 and 26 for respectively locating one or more contact lenses therein in use, are attached to the central rod. In use, the perforated chambers 24 and 26 are in fluid communication with the cleaning solution located in the chamber 23.

10 A platinum electrode pad 30 is provided on the outer surface of the rod 38, adjacent and below the cap 36. In use, a sufficient quantity of the cleaning solution is provided in the chamber 23 so that the platinum electrode pad is in contact with the cleaning solution.

15 The cap 36 has a recess in which a power source in the form of an LR44 battery 32 resides in use.

The platinum electrode pads (28,30) are respectively connected to the battery 32 by wires (40, 41). The wires (40, 41) are made of copper. The wires (40,41) respectively comprise cap wire portions (40A,41A) and chamber wire portions (40B,41B). The cap wire portions (40A,41A) extend through the cap 36 while the chamber wire portion (40B) extends along the surface of the central rod 38 and the chamber wire portion (41B) extends along the side of the cylindrical chamber 22. In use, the cap 36 is screwed onto the cylindrical body 22 so that the cap wire portions (40A,41A) respectively contact the chamber wire portion (40B,41B). Accordingly, the cap 36 acts as a switch so that an electrical circuit is activated by attachment of the cap on the cylindrical body 22 and deactivated by detachment of the cap off the cylindrical body 22.

The ends of the wires (40A and 40B) are in direct contact with the battery 32, while the opposite ends of the wires (40A and 40B) are respectively connected to the platinum electrodes pads (28,30). In use, a contact lenses
5 is located in the chambers 24 and/or 26. An electric field is applied to the cleaning solution by providing a power source 32 in the power source recess 34. The contact lens case 50 may be sold with instructions for cleaning contact lenses. The instructions should describe to the user that
10 sufficient cleaning solution should be placed in the chamber 23 to cover and make contact with the electrodes (28,30). The instructions should also describe a minimum time of exposure to the electric field to effect prevention of biofilm formation on the surface of a
15 contact lens. This minimum time will be dependent on the electric field power and the cleaning solution used, however a typical minimum time would be about 3 hours when 1.5 V is applied.

The case 50 can also be manufactured by injection
20 molding.

Embodiment 3

Referring to Fig. 3, there is shown a cross-sectional front view of a contact lens cleaning case 50'. The
25 contact lens cleaning case 50' is similar to the contact lens cleaning case 50 of the second embodiment, and where features are the same, they are indicated by the same reference numeral with the prime symbol ('). The contact lens 50' conducting wires (40A',41A') are connected to a
30 power socket 62 instead of a removable power source such as a battery.

The power socket 62 is capable of being electrically connected to a fixed power source such as a household power supply.

5 **Example 1**

A contact lens was located inside the contact lens enclosure of a contact lens case according to embodiment 1. The contact lens enclosure was filled with Phosphate Buffered Saline (PBS) solution. A 1.5V LR44 battery was
10 provided in the power source recess. The contact lens was inspected at 3 hours, 6 hours and 10 hours.

Example 2

Another contact lens was located inside the contact lens
15 enclosure of a contact lens case according to embodiment 1. The contact lens enclosure was also filled with Phosphate Buffered Saline (PBS) solution. 3.0V power source (2 LR44 batteries) was provided in the power source recess. The contact lens was inspected at 3 hours, 6 hours
20 and 10 hours.

Comparative Example

A contact lens was located inside the contact lens enclosure of a normal contact lens case not according to
25 the invention. The contact lens enclosure was filled with Phosphate Buffered Saline (PBS) solution. The contact lens was observed at 3 hours, 6 hours and 10 hours.

Significant reduction in biofilm formation was observed on the contact lenses located inside the contact
30 lens cases according to embodiment 1. The results are summarized in Table I.

Table I

Sr. No.	Reduction in Biofilm formation		
	After 3 hrs	After 6 hrs	After 10 hrs
Example 1	1.5 Fold	7 fold	10 fold
Example 2	3 Fold	8 fold	10 fold
Comparative Example	No reduction	No reduction	No reduction

Applications

An advantage of the disclosed embodiments is that, 5
biofilm formation and its attachment to the surface of a
contact lens can be prevented using simple solutions like
water and saline. Prevention of biofilm formation makes
contact lenses safer. The disclosed contact lens case can
be used for routine overnight storage of contact lenses,
10 such as for 4 to 8 hours.

The disclosed embodiments provide a portable and an
easy to use device for sterile storage of contact lenses.
One of the embodiments of the present invention provides a
contact lens case that can prevent formation of biofilm
15 for a long duration by using a normal watch battery. Thus
the embodiments of the invention provide cost effective
solutions to the problem of biofilm formation.

The disclosed embodiments do not require use of harsh
chemicals to prevent biofilm formation. Biofilm formation
20 can be prevented using the commercially available contact
lens cleaning solutions or even homemade saline. The
contact lens cleaning case of the present invention can be
used for any type of contact lens.

In other embodiments, the case may be disposable and
25 may be sold commercially with an in-situ non-replaceable
battery.

It will be apparent that various other modifications and adaptations of the invention will be apparent to the person skilled in the art after reading the foregoing disclosure without departing from the spirit and scope of
5 the invention and it is intended that all such modifications and adaptations come within the scope of the appended claims.

Claims

1. A contact lens case comprising:
 - at least one contact lens enclosure for containing a cleaning solution therein;
 - 5 a power source recess for allowing a removable power source to be provided therein; and
 - at least two electrodes extending from the power source recess to the at least one contact lens enclosure.
- 10 2. A contact lens case comprising:
 - at least one contact lens enclosure for containing a cleaning solution therein;
 - a power source; and
 - at least two electrodes extending from the power
 - 15 source to the at least one contact lens enclosure, wherein the formation of an electric circuit across the electrodes is controlled by the presence or absence of cleaning solution in the at least one contact lens enclosure.
- 20 3. A contact lens case comprising:
 - at least one contact lens enclosure for containing a cleaning solution therein, the enclosure having an opening;
 - 25 a cap capable of releasable attachment to the contact lens enclosure for covering the opening;
 - a power source; and
 - at least two electrodes extending from the power source to the at least one contact lens enclosure,
 - 30 wherein the formation of an electric circuit across the electrodes is controlled by attachment of the cap on the enclosure and detachment of the cap off the enclosure.
4. A contact lens case according to claim 1, claim 2 or

claim 3, wherein the electrodes are metal.

5. A contact lens case according to claim 4 wherein the metal is selected from the group consisting of copper, aluminum, silver, gold, platinum, palladium, nickel, ferrous alloys, copper alloy electrodes, and alloys thereof.

6. A contact lens case according to claim 1, wherein the removable power source is a chemical battery.

7. A contact lens case according to claim 2 or claim 3, wherein the power source is a chemical battery.

8. A contact lens case according to claim 6 or claim 7, wherein the chemical battery is selected from the group consisting of AA type, AAA type, LR44, CR type and PP3 type batteries

9. A contact lens case according to any one of the preceding claims, comprising a pair of contact lens enclosures.

10. A contact lens case according to any one of the preceding claims, comprising a locator for locating a contact lens in position within the enclosure relative to the electrodes.

11. A contact lens case according to any one of the preceding claims, wherein the electrodes are in the shape of a plate, or a rod or a coil.

12. A contact lens case according to any one of the preceding claims comprising a regulator for regulating

the strength of an electric field applied to the cleaning solution in use.

13. A method of preventing biofilm formation on the surface of a contact lens using a contact lens case as defined in any one of claims 1 to 12, the method comprising the steps of:

providing a cleaning solution in the contact lens enclosure;

10 locating the contact lens in the cleaning solution; and

applying an electric field to the solution.

14. A method as claimed in claim 13, wherein the voltage applied across the two electrodes is in the range selected from the group consisting of 0.1V to 6.0V, 0.5V to 5.5V, 1V to 5V, 1.5V to 4.5 V, 1.5 to 3.0 V, 3.0 to 4.5V.

20 15. A method as claimed in claim 13 or claim 14, wherein the cleaning solution is selected from a group consisting of water, saline, commercially available contact lens cleaning solutions and mixtures thereof.

25 16. A method of manufacturing a contact lens case, the method comprising the step of:

placing a mould forming material in a mould, the mould having a defined shape to form a contact lens case as claimed in claim 1, claim 2 or claim 3.

30

17. A method as claimed in claim 16, further comprising the step of:

placing electrodes in each of the at least two electrode recesses.

18. A contact lens kit comprising:

a contact lens case as claimed in any one of claims
1 to 12 ; and

5 instructions for using the contact lens cleaning
case for killing one or more microorganisms present in
biofilm on the surface of a contact lens.

19. A contact lens case, substantially as herein
10 described with reference to any one of the drawings.