

Claims

1. A plasma generator comprising a cathode, an anode and a stabilizing electrode,
wherein the stabilizing electrode stabilises a region of plasma within a fluid.
2. A plasma generator according to claim 1, wherein the stabilizing electrode stabilises
an interface between the region of plasma and the fluid.
3. A plasma generator according to claim 1 or claim 2, wherein the stabilizing electrode
initiates the plasma.
4. A plasma generator according to any preceding claim, wherein the stabilizing
electrode is positioned between the cathode and the anode.
5. A plasma generator according to any preceding claim, wherein the stabilizing
electrode emits charged particles into the fluid.
6. A plasma generator according to any preceding claim, wherein a high voltage direct
current power supply is coupled to the cathode and the anode.
7. A plasma generator according to any preceding claim, wherein a high frequency
alternating current power supply is coupled to the cathode and the stabilizing
electrode.
8. A plasma generator according to any preceding claim, wherein the region of plasma
is confined between the stabilizing electrode and the cathode.
9. A plasma generator according to any preceding claim, wherein a current generated
between the cathode and the stabilizing electrode is lower than a current flow from
the cathode to the anode.
10. A plasma generator according to any preceding claim, wherein a potential difference
between the cathode and the stabilizing electrode is higher than a potential
difference between the cathode and the anode.
11. A plasma generator according to any preceding claim, wherein the stabilizing
electrode has a configuration selected from a plate, a sphere, a rod and combinations
thereof.

12. A plasma generator according to any preceding claim, wherein the stabilizing electrode is porous.
- 5 13. A plasma generator according to claim 6, wherein a decoupling inductor is interposed between the high voltage direct current power supply and the cathode.
14. A plasma generator according to claim 6, wherein a decoupling inductor is interposed between the high voltage direct current power supply and the anode.
- 10 15. A plasma generator according to claim 7, wherein a decoupling capacitor is interposed between the high frequency alternating current power supply and the cathode.
- 15 16. A plasma generator according to claim 7, wherein a decoupling capacitor is interposed between the high frequency alternating current power supply and the anode.
- 20 17. A plasma generator according to any preceding claim, additionally comprising an inlet for delivering a catalyst to the region of plasma facilitating chemical reaction within the plasma generator.
- 25 18. A plasma generator according to any preceding claim, wherein the fluid comprises a catalyst.
19. A plasma generator according to any preceding claim, coupled to a heat exchanger.
20. A method for plasma generation within a fluid, the method comprising the steps of:
a) forming a region of plasma; and
30 b) stabilizing the region of plasma using a stabilizing electrode.
21. A method according to claim 20, wherein the fluid is water and the plasma heats the water.
- 35 22. A method according to claim 20, wherein the fluid is a saline solution and the plasma desalinates the saline solution to produce water.
23. Use of a method according to any of claims 1 to 19, in heating systems.

24. Use of a method according to any of claims 1 to 19, in the desalination of water.