CLAIMS

What is claimed is:

1. A method for producing a solution, the method comprising:

electrolyzing a first solution comprising a quaternary ammonium compound in solution; and

producing a second solution comprising a quaternary ammonium hypohalite in solution.

2. The method of claim 1 wherein the quaternary ammonium compound comprises a quaternary ammonium halide.

3. The method of claims 1 or 2 wherein the first solution further comprises a halide salt in solution.

4. The method of claim 3 wherein the halide salt comprises an alkali metal halide salt.

5. The method of claims 1, 2, 3, or 4 wherein the first solution comprises a compound selected from the group consisting of surfactant, organic surfactant, colorant, perfume, disinfectant, germicide, and biocide.

6. The method of any of claims 1-5 or 9 wherein the second solution further comprises an additional oxidant species.

7. The method of claim 6 wherein the additional oxidant species is selected from the group consisting of halide based oxidant, halogen, hydrogen peroxide, ozone, chlorine dioxide, and combinations thereof.

8. The method of claim 6 wherein a combination of the quaternary ammonium hypohalite and the additional oxidant species in the second solution substantially increases the disinfection efficacy of the second solution over an unelectrolyzed solution comprising the quaternary ammonium hypohalite and the additional oxidant species mixed together in solution.

9. The method of any of claims 1-8 wherein the second solution does not substantially comprise a halide salt.

10. A method of producing a solution, the method comprising:

electrolyzing a first solution comprising a first quaternary ammonium compound in solution and a second component; and

producing a second solution comprising a second quaternary ammonium compound in solution and a second compound.

11. The method of claim 10 wherein the second component comprises ammonia or an ammonium salt and the second compound comprises a haloamine.

12. The method of claim 10 wherein the second component comprises a chlorite salt and the second compound comprises chlorine dioxide.

13. The method of claim 10 wherein the second component comprises dissolved oxygen at a greater concentration than a naturally occurring dissolved oxygen concentration of the first solution and the second compound comprises hydrogen peroxide.

14. The method of claim 13 wherein the electrolyzing step is performed in a divided electrolytic cell and the second quaternary ammonium compound and hydrogen peroxide is produced in the cathodic compartment of the divided electrolytic cell.

15. The method of claim 14 wherein the first solution comprises a quaternary ammonium halide or a halide salt.

16. The method of claim 15 wherein the second solution comprises a quaternary ammonium hypohalite produced in the anodic compartment of the divided electrolytic cell.

17. A device for dispensing the solution produced in any of claims 1-16, the device comprising:

a flow through electrolytic cell comprising an anode and a cathode; and

a spray nozzle for dispensing the solution.

18. The device of claim 17 comprising a spray bottle configuration, wherein electrolysis of the solution is activated by a user squeezing a trigger.

19. The device of claim 18 wherein electrolysis of the solution is activated by a user moving a lever or a user placing at least one hand under said device.

20. A device for dispensing wipes comprising a solution, the device comprising:

a supply of wipes, said wipes comprising a quaternary ammonium compound;

an anode; and

a cathode;

wherein said wipes are disposable between said anode and said cathode, at which time the quaternary ammonium compound is electrolyzed.

21. The device of claim 20 wherein said wipes comprise a compound selected from the group consisting of quaternary ammonium halide, halide salt, surfactant, organic surfactant, colorant, perfume, disinfectant, germicide, and biocide.

22. The device of claims 20 or 21 wherein said anode comprises a drum anode and said cathode comprises a drum cathode.

23. The device of claims 20 or 21 wherein said anode and said cathode each comprise a flat plate, said device further comprising a mechanism for pressing a wipe between said anode and said cathode.

24. A method for on demand generation of a quaternary ammonium hypohalite solution, the method comprising:

signaling a desired amount of a first solution comprising a quaternary ammonium hypohalite in solution to be produced;

mixing a second solution comprising a quaternary ammonium compound in solution with a third solution comprising a halogen solution, the amounts of the second solution and third solution corresponding to the desired amount of the third solution;

producing the desired amount of the third solution; and

dispensing the desired solution immediately or prior to significant degradation of the third solution.

25. The method of claim 24 wherein the halogen solution comprises a compound selected from the group consisting of bleach, hypochlorous acid, hypobromous acid, hypoiodous acid, hypochlorite, hypobromite, hypoiodite, and hypohalite.

CLAIMS

1. A method for producing a solution, the method comprising:

electrolyzing a first solution comprising a quaternary ammonium compound in solution; and

producing a second solution comprising a quaternary ammonium hypohalite in solution.

2. The method of claim 1 wherein the quaternary ammonium compound comprises a quaternary ammonium halide.

3. The method of claim 1 wherein the first solution further comprises a halide salt in solution.

4. The method of claim 3 wherein the halide salt comprises an alkali metal halide salt.

5. The method of claims 1, 2, 3, or 4 wherein the first solution comprises a compound selected from the group consisting of surfactant, organic surfactant, colorant, perfume, disinfectant, germicide, and biocide.

6. The method of any of claims 1-4 wherein the second solution further comprises an additional oxidant species.

7. The method of claim 6 wherein the additional oxidant species is selected from the group consisting of halide based oxidant, halogen, hydrogen peroxide, ozone, chlorine dioxide, and combinations thereof.

8. The method of claim 6 wherein a combination of the quaternary ammonium hypohalite and the additional oxidant species in the second solution substantially increases the disinfection efficacy

of the second solution over an unelectrolyzed solution comprising the quaternary ammonium hypohalite and the additional oxidant species mixed together in solution.

9. The method of any of claims 1-4 wherein the second solution does not substantially comprise a halide salt.

10. A method of producing a solution, the method comprising:

electrolyzing a first solution comprising a first quaternary ammonium compound in solution and a second component; and

producing a second solution comprising a second quaternary ammonium compound in solution and a second compound.

11. The method of claim 10 wherein the second component comprises ammonia or an ammonium salt and the second compound comprises a haloamine.

12. The method of claim 10 wherein the second component comprises a chlorite salt and the second compound comprises chlorine dioxide.

13. The method of claim 10 wherein the second component comprises dissolved oxygen at a greater concentration than a naturally occurring dissolved oxygen concentration of the first solution and the second compound comprises hydrogen peroxide.

14. The method of claim 13 wherein the electrolyzing step is performed in a divided electrolytic cell and the second quaternary ammonium compound and hydrogen peroxide is produced in the cathodic compartment of the divided electrolytic cell.

15. The method of claim 14 wherein the first solution comprises a quaternary ammonium halide or a halide salt.

16. The method of claim 15 wherein the second solution comprises a quaternary ammonium hypohalite produced in the anodic compartment of the divided electrolytic cell.

17. A device for dispensing the solution produced in any of claims 1-4 or 10-16, the device comprising:

a flow through electrolytic cell comprising an anode and a cathode; and

a spray nozzle for dispensing the solution.

18. The device of claim 17 comprising a spray bottle configuration, wherein electrolysis of the solution is activated by a user squeezing a trigger.

19. The device of claim 18 wherein electrolysis of the solution is activated by a user moving a lever or a user placing at least one hand under said device.

20. A device for dispensing wipes comprising a solution, the device comprising:

a supply of wipes, said wipes comprising a quaternary ammonium compound;

an anode; and

a cathode;

wherein said wipes are disposable between said anode and said cathode, at which time the quaternary ammonium compound is electrolyzed.

21. The device of claim 20 wherein said wipes comprise a compound selected from the group consisting of quaternary ammonium halide, halide salt, surfactant, organic surfactant, colorant, perfume, disinfectant, germicide, and biocide.

22. The device of claims 20 or 21 wherein said anode comprises a drum anode and said cathode comprises a drum cathode.

23. The device of claims 20 or 21 wherein said anode and said cathode each comprise a flat plate, said device further comprising a mechanism for pressing a wipe between said anode and said cathode.

24. A method for on demand generation of a quaternary ammonium hypohalite solution, the method comprising:

signaling a desired amount of a first solution comprising a quaternary ammonium hypohalite in solution to be produced;

mixing a second solution comprising a quaternary ammonium compound in solution with a third solution comprising a halogen solution, the amounts of the second solution and third solution corresponding to the desired amount of the third solution;

producing the desired amount of the third solution; and

dispensing the desired solution immediately or prior to significant degradation of the third solution.

25. The method of claim 24 wherein the halogen solution comprises a compound selected from the group consisting of bleach, hypochlorous acid, hypobromous acid, hypoiodous acid, hypochlorite, hypobromite, hypoiodite, and hypohalite.