CLAIMS

What is claimed is:

1. An electrochemical cell for performing electrochemical analysis, the electrochemical cell comprising:

a plurality of working electrode zones disposed, and defining a pattern, on a surface of the electrochemical cell; and

at least one auxiliary electrode disposed on the surface, the at least one auxiliary electrode having a redox couple confined to its surface,

wherein the at least one auxiliary electrode is disposed at an approximate equal distance from at least two of the plurality of working electrode zones

wherein:

the at least one auxiliary electrode has between approximately $1.80x10^{-7}$ to $2.32x10^{-7}$ moles of oxidizing agent per mm^2 of auxiliary electrode area, or

the redox couple is configured to pass approximately 0.5 to 4.0 mA of current throughout a redox reaction of the redox couple to generate electrochemiluminescence (ECL) at a range of approximately 1.4V to 2.6V, or

the redox couple is configured to pass a charge of approximately less than or equal to $4.1x10^{-2}$ C/mm^2 of electrode areal surface area.

2. The electrochemical cell of claim 1, wherein, during the electrochemical analysis, the auxiliary electrode has a potential defined by the redox couple.

3. The electrochemical cell of claim 2, wherein the potential ranges from approximately 0.1 volts (V) to approximately 3.0 V.

4. The electrochemical cell of claim 3, wherein the potential is approximately 0.22 V.

5. The electrochemical cell of claim 1, wherein the pattern minimizes a number of working electrode zones that are adjacent to one another for each of the working electrode zones among the plurality of working electrode zones.

6. The electrochemical cell of claim 1, wherein the pattern is configured to provide uniform mass transport of a substance to each of the plurality of working electrode zones under conditions of rotational shaking.

7. The electrochemical cell of claim 1, wherein each of the plurality of working electrode zones defines a circular shape having surface area that defines a circle.

8. The electrochemical cell of claim 7, wherein:

the at least one auxiliary electrode is disposed at an approximate center of the electrochemical cell,

the plurality of working electrode zones includes ten working electrode zones spaced approximately equidistant from the at least one auxiliary electrode, and

two working electrode zones have a greater pitch distance therebetween than a remainder of the working electrode zones.

9. The electrochemical cell of claim 1, wherein the redox couple comprises a mixture of silver (Ag) and silver chloride (AgCl).

10. The electrochemical cell of claim 9, wherein the mixture of Ag and AgCl comprises approximately 50 percent or less AgCl.

11. The electrochemical cell of claim 10, wherein the mixture has a molar ratio of Ag to AgCl within a specified range.

12. The electrochemical cell of claim 9, wherein, during the electrochemical analysis the auxiliary electrode has a potential defined by the redox couple, and

wherein the potential is approximately 0.22 volts (V).

13. The electrochemical cell of claim 1, wherein the electrochemical analysis comprises electrochemiluminescence (ECL) analysis.

14. The electrochemical cell of claim 1, wherein the auxiliary electrode has a defined interfacial potential.

15. The electrochemical cell of claim 14, wherein an amount of an oxidizing agent in the at least one auxiliary electrode is greater than or equal to an amount of charge required to pass through the at least one auxiliary electrode to complete the electrochemical analysis.

16. The electrochemical cell of claim 15, wherein the at least one auxiliary electrode has between approximately 3.07×10^{-7} to 3.97×10^{-7} moles of oxidizing agent.

17. The electrochemical cell of claim 15, wherein the at least one auxiliary electrode has between approximately 1.80×10^{-7} to 2.32×10^{-7} moles of oxidizing agent per mm^2 of auxiliary electrode area.

18. The electrochemical cell of claim 15, wherein the at least one auxiliary electrode has at least approximately 3.7×10^{-9} moles of oxidizing agent per mm^2 of total working electrode area in the well.

19. The electrochemical cell of claim 14, wherein the plurality of working electrode zones have an aggregate exposed area, the at least one auxiliary electrode has an exposed surface area, and the aggregate exposed area of the plurality of working electrode zones divided by the exposed surface area of the at least one auxiliary electrode define an area ratio that has a value greater than 1.

20. The electrochemical cell of claim 14, wherein the at least one auxiliary electrode comprises a mixture of silver (Ag) and silver chloride (AgCl).

21. The electrochemical cell of claim 20, wherein the mixture of Ag and AgCl comprises approximately 50 percent or less AgCl.

22. The electrochemical cell of claim 20, wherein the mixture has a molar ratio of Ag to AgCl within a specified range.

23. The electrochemical cell of claim 22, wherein the molar ratio is approximately equal to or greater than 1.

24. The electrochemical cell of claim 14, wherein the electrochemical cell is part of a flow cell.

25. The electrochemical cell of claim 14, wherein the electrochemical cell is part of a plate.

26. The electrochemical cell of claim 14, wherein the electrochemical cell is part of a cartridge.

27. An apparatus for performing electrochemical analysis, the apparatus comprising:

a plate with a plurality of wells defined therein, at least one well from the plurality of wells comprising:

the electrochemical cell of claim 1;

wherein the at least one auxiliary electrode disposed on the surface is formed of a chemical mixture comprising an oxidizing agent, and

wherein an amount of the oxidizing agent is sufficient to maintain a defined potential throughout an entire redox reaction of the redox couple.

28. The apparatus of claim 27, wherein the redox couple passes approximately 0.5 to 4.0 mA of current throughout a redox reaction of the redox couple to generate electrochemiluminescence (ECL) at a range of approximately 1.4V to 2.6V.

29. The apparatus of claim 27, wherein the redox couple passes an average current of approximately 2.39 mA throughout a redox reaction to generate electrochemiluminescence (ECL) at a range of approximately 1.4 to 2.6 V.

30. The apparatus of claim 27, wherein the redox couple maintains an interface potential of between -0.15 to -0.5 V while passing a charge of approximately $1.56x10^{-5}$ to $5.30x10^{-4}$ C/mm^2 of electrode surface area.

31. The apparatus of claim 27, wherein the number of working electrode zones that are adjacent to one another is no greater than two.

32. The apparatus of claim 27, wherein at least one of the plurality of working electrode zones is adjacent to three or more other working electrode zones among the plurality of working electrode zones.

33. The apparatus of claim 27, wherein the pattern comprises a geometric pattern.