CLAIMS:

1. A composition comprising:
   (a) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, (ii) a pH buffering component, and (iii) an ionic component; or
   (b) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, a pH buffering component, (iii) an ionic component; and (iv) a surfactant; or
   (c) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, (ii) a pH buffering component, (iii) an ionic component, and (iv) a liquid diluent; or
   (d) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, a pH buffering component, (iii) an ionic component; (iv) a surfactant; and (v) a liquid diluent.

2. A composition consisting essentially of:
   (a) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, (ii) a pH buffering component, and (iii) an ionic component; or
   (b) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, a pH buffering component, (iii) an ionic component; and (iv) a surfactant; or
   (c) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, (ii) a pH buffering component, (iii) an ionic component, and (iv) a liquid diluent; or
   (d) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, a pH buffering component, (iii) an ionic component; (iv) a surfactant; and (v) a liquid diluent.

3. A composition consisting of:
   (a) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, (ii) a pH buffering component, and (iii) an ionic component; or
   (b) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, a pH buffering component, (iii) an ionic component; and (iv) a surfactant; or
   (c) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, (ii) a pH buffering component, (iii) an ionic component, and (iv) a liquid diluent; or

(d) (i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE) or both, a pH buffering component, (iii) an ionic component; (iv) a surfactant; and (v) a liquid diluent.

4. The composition of claim 1, further comprising at least one of an ECL label, a binding reagent for a binding assay, a preservative, a biocide, an anti-foaming agent, a perchlorate compound, a coloring agent, a tracer chemical, a solid support, or combinations thereof.

5. The composition of any of the preceding claims, wherein the pH buffering component is tris(hydroxymethyl)aminomethane (Tris).

6. The composition of any of the preceding claims, wherein the pH buffering component is Tris and the composition comprises a surfactant.

7. The composition of claim 6, wherein the surfactant comprises a phenol ether.

8. The composition of claim 7, wherein the surfactant is TRITON X-100.

9. The composition of claim 6, wherein the surfactant does not comprise a phenol ether.

10. The composition of claim 9, wherein the composition does not disrupt lipid bilayer membranes.

11. The composition of claim 10, wherein the surfactant is KOLLIPHOR P-407, PLURONIC P-123, PLURONIC L-121, PLURONIC 31R1, TETRONIC 701, 2,4,7,9-tetramethyl-d-decyne-4,7-diol ethoxylate, PEG(18) tridecyl ether, BRIJ L4, BRIJ 58 or TWEEN 20.

12. The composition of claim 11, wherein the surfactant is TWEEN-20.

13. The composition of claim 11, wherein the surfactant is PEG(18) tridecyl ether.

14. The composition of any of claims 1 to 4, comprising a surfactant that does not comprise a phenol ether.

15. The composition of claim 14, wherein the composition does not disrupt lipid bilayer membranes.

16. The composition of claim 15, wherein the surfactant is KOLLIPHOR P-407, PLURONIC P-123, PLURONIC L-121, PLURONIC 31R1, TETRONIC 701, 2,4,7,9-tetramethyl-d-decyne-4,7-diol ethoxylate, PEG(18) tridecyl ether, BRIJ L4, BRIJ 58 or TWEEN 20.

17. The composition of claim 16, wherein the surfactant is TWEEN 20.

18. The composition of claim 16, wherein the surfactant is PEG(18) tridecyl ether.

19. The composition of any of claims 14 to 18, wherein the pH buffering component is phosphate, HEPES, glycylglycine, borate, acetate or citrate.

20. The composition of any of the preceding claims, wherein the composition comprises BDEA.

21. The composition of any of the preceding claims, wherein the composition comprises DBAE.

22. The composition of any of the preceding claims, wherein an ECL generated by an ECL label in the presence of the composition changes, on average, by less than 1% per °C over the temperature range of 18°C to 30°C.

23. The composition of claim 22, wherein the ECL is generated from an electrochemiluminescent ruthenium organometallic complex in proximity to a carbon-based electrode.

24. The composition of any of the preceding claims, wherein the pH is between about 6 and about 9.

25. The composition of claim 24, wherein the pH is between about 7 and about 8.

26. The composition of claim 25, wherein the pH is between about 7.6 and about 7.9.

27. The composition of claim 26, wherein the pH is about 7.8.

28. The composition of any of the preceding claims, wherein a slope of a change in ECL with pH for an ECL generated by an ECL label in the presence of the composition is less than 10% per pH unit.

29. The composition of claim 28, wherein the ECL is generated from an electrochemiluminescent ruthenium organometallic complex in proximity to a carbon-based electrode.

30. The composition of any claims 1 to 29, wherein the ionic component comprises chloride ion.

31. The composition of claim 30, wherein the ionic component comprises NaCl, KCl, LiCl or combinations of any two or any three of the salts.

32. The composition of claim 31, wherein the ionic component comprises NaCl.

33. The composition of claim 31, wherein the ionic component comprises KCl.

34. The composition of any of claims 1-33, comprising a liquid diluent.

35. The composition of claim 34, wherein the liquid diluent is water and the composition is substantially aqueous.

36. The composition of any of the preceding claims, wherein the concentration of BDEA or DBAE is between about 10 mM and about 800 mM.

37. The composition of claim 36, wherein the concentration of BDEA or DBAE is between about 75 mM and about 300 mM.

38. The composition of claim 37, wherein the concentration of BDEA or DBAE is between about 100 mM and about 150 mM.

39. The composition of any of the preceding claims, wherein a change in the concentration of BDEA or DBAE from 0.8 to 1.2 times the nominal value provides less than a 10% change in an ECL generated by an ECL label in the presence of the composition.

40. The composition of claim 39, wherein the ECL is generated from an electrochemiluminescent ruthenium organometallic complex in proximity to a carbon-based electrode.

41. The composition of any of the preceding claims, wherein the concentration of the pH buffering component is between about 10 mM and about 800 mM.

42. The composition of claim 41, wherein the concentration of the pH buffering component is between about 100 mM and about 300 mM.

43. The composition of claim 42, wherein the concentration of the pH buffering component is between about 150 mM and about 250 mM.

44. The composition of any of the preceding claims, wherein the composition has an ionic strength greater than about 0.3 M.

45. The composition of claim 44, wherein the composition has an ionic strength of greater than about 0.5 M.

46. The composition of claim 45, wherein the composition has an ionic strength of greater than about 0.8 M.

47. The composition of claim 46, wherein the composition has an ionic strength of greater than about 1.0 M.

48. The composition of any of the preceding claims, wherein the composition comprises chloride ion and the concentration of chloride ion is greater than about 0.25 M.

49. The composition of any of the preceding claims, wherein the composition comprises chloride ion and the concentration of chloride ion is greater than about 0.5 M.

50. The composition of any of the preceding claims, wherein the composition comprises chloride ion and the concentration of chloride ion is greater than about 0.75 M.

51. The composition of any of the preceding claims, wherein the composition comprises chloride ion and the concentration of chloride ion is greater than about 1.0 M.

52. The composition of any of the preceding claims, wherein the pH buffering component is not phosphate and the composition provides at least a 20% increase in an ECL generated by an ECL label and/or at least a 20% decrease in

background ECL generated in the absence of an ECL label, compared with the same composition that contains phosphate as the pH buffering component.

53. The composition of claim 52, wherein the ECL from the ECL label is generated from an electrochemiluminescent ruthenium organometallic complex in proximity to a carbon-based electrode and/or ECL in the absence of an ECL label is generated at a carbon-based electrode.

54. The composition of any of the preceding claims, wherein nonspecific binding (NSB) in an immunoassay is lower with the composition containing the ionic component compared to the same composition that contains no ionic component.

55. The composition of any of claims 1 to 33, wherein the composition does not include a liquid diluent and the composition is provided in dry form.

56. A kit comprising in one or more containers the following materials:
(a) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE), or both;
(b) a pH buffering component; and
(c) an ionic component.

57. The kit of claim 56, wherein one or more of the materials is in dry form.

58. The kit of claim 57, wherein the kit further comprises a liquid diluent.

59. The kit of claim 56 or 57, wherein the kit does not comprise a surfactant or liquid diluent.

60. The kit of claim 56 or 57, wherein the kit further comprises a surfactant.

61. A method for producing a composition comprising
combining
(i) N-butyldiethanolamine (BDEA) or 2-dibutylaminoethanol (DBAE), or both;
(ii) a pH buffering component; and
(iii) an ionic component.

62. The method of claim 61, wherein one or more of the materials is in dry form.

63. A kit comprising the composition of any of claims 1 to 55 and:
(a) an assay instrument;
(b) an assay consumable;
(c) an additional assay reagent;
(d) an assay sample;
or a combination thereof.

64. A kit comprising the kit components of any of claims 56 to 60 and:
(a) an assay instrument;
(b) an assay consumable;
(c) an additional assay reagent;
(d) an assay sample;
or a combination thereof.

65. The kit of any of claims 63 and 64, comprising an assay instrument, wherein the assay instrument is configured to conduct ECL assays.

66. The kit of any of claims 63 to 65, comprising an assay consumable and further comprising an electrode configured for use in an ECL assay.

67. The kit of claim 66, wherein the electrode is a carbon-based electrode.

68. The kit of claim 67, wherein the electrode is a screen printed carbon ink electrode.

69. The kit of any of claims 63 to 68, comprising an additional assay reagent, wherein the additional assay reagent is a binding reagent.

70. The kit of claim 69, wherein the binding reagent is labeled with an ECL label.

71. The kit of claim 70, wherein the label is an organometallic ruthenium complex.

72. The kit of any of claims 66 to 68, comprising an additional assay reagent, wherein the additional assay reagent is a binding reagent and the additional assay reagent is immobilized on the electrode.

73. The kit of any of claims 66 to 68, comprising an additional assay reagent, wherein the additional assay reagent is a plurality of binding reagents that are immobilized as an array on the electrode.

74. The kit of any of claims 66 to 68, comprising an additional assay reagent, wherein the additional assay reagent is a binding reagent immobilized on a particle.

75. The kit of claim 74, wherein the particle is magnetically collectable.

76. The kit of any of claims 64 to 75, comprising at least one assay sample, wherein the at least one assay sample includes an assay calibrator sample and/or an assay control sample.

77. A method for generating ECL comprising:
(a) contacting an electrode with
(i) a composition according to any of claims 1 to 56 and
(ii) an ECL label;
(b) applying a voltage to the electrode; and
(c) generating ECL.

78. A method of claim 77, further comprising:
(d) measuring the ECL.

79. A method for measuring the quantity of an ECL label comprising:
(a) contacting an electrode with
(i) a composition according to any of claims 1 to 55 and
(ii) the ECL label;
(b) applying a voltage to the electrode;
(c) generating ECL;
(d) measuring the ECL; and
(e) determining, from the measured ECL, the quantity of the label.

80. A method for measuring the quantity of a binding complex comprising a binding reagent linked to an ECL label, the method comprising:
(a) contacting an immobilized binding reagent on an electrode with a labeled binding reagent comprising an ECL label;
(b) forming a binding complex on the electrode comprising the immobilized binding reagent and the labeled binding reagent;
(c) contacting the binding complex on the electrode with a composition according to any of claims 1 to 55;

(d) applying a voltage to the electrode in the presence of the composition;
(e) generating ECL; and
(f) measuring the ECL to determine the quantity of the binding complex on the electrode.

81. The method of claim 80, wherein the method further comprises washing the electrode after formation of the binding complex and prior to and/or during contacting the electrode with the composition.

82. A method for measuring the quantity of a binding complex comprising a binding reagent linked to an ECL label, the method comprising:
(a) contacting an immobilized binding reagent on a particle with a labeled binding reagent comprising an ECL label;
(b) forming a binding complex on the particle comprising the immobilized binding reagent and the labeled binding reagent;
(c) contacting the binding complex on the particle with a composition according to any of claims 1 to 55;
(d) collecting the particle on an electrode;
(e) applying a voltage to the electrode in the presence of the composition;
(f) generating ECL; and
(g) measuring the ECL to determine the quantity of the binding complex on the electrode.

83. The method of claim 82, wherein the particle is a magnetically collectable particle and the particle is collected on the electrode using a magnetic field.

84. The method of claim 82 or claim 83, wherein the method further comprises washing the particle after formation of the binding complex and prior to and/or during contacting the particle with the composition.

85. The method of any of claims 80 to 84, wherein the immobilized binding reagent and labeled binding reagent bind directly to each other.

86. The method of any of claims 80 to 84, wherein the immobilized binding reagent and labeled binding reagent bind indirectly to each other through other binding species.

87. A method for measuring the quantity of an analyte, the method comprising:
(a) contacting an immobilized binding reagent on an electrode with a labeled binding reagent comprising an ECL label and the analyte (or a sample comprising the analyte);
(b) forming a binding complex on the electrode comprising the immobilized binding reagent and the labeled binding reagent;
(c) contacting the binding complex on the electrode with a composition according to any of claims 1 to 55;
(d) applying a voltage to the electrode in the presence of the composition;
(e) generating ECL; and
(f) measuring the ECL to determine the quantity of the analyte.

88. The method of claim 87, wherein the method further comprises washing the electrode after formation of the binding complex and prior to and/or during contacting the electrode with the composition.

89. The method of claim 87 or 88, wherein the method is configured to carry out a multiplexed measurement of a plurality of analytes, and the electrode has immobilized thereon an array of immobilized binding reagents for the plurality of analytes.

90. A method for measuring the quantity of an analyte, the method comprising:
(a) contacting an immobilized binding reagent on a particle with a labeled binding reagent comprising an ECL label and an analyte (or a sample comprising the analyte);
(b) forming a binding complex on the particle comprising the immobilized binding reagent and the labeled binding reagent;
(c) contacting the binding complex on the particle with a composition according to any of claims 1 to 55;
(d) collecting the particle on an electrode;
(e) applying a voltage to the electrode in the presence of the composition;
(f) generating ECL; and
(g) measuring the ECL to determine the quantity of the analyte.

91. The method of claim 90, wherein the particle is a magnetically collectable particle and the particle is collected on the electrode using a magnetic field.

92. The method of claim 90 or claim 91, wherein the method further comprises washing the particle after formation of the binding complex and prior to and/or during contacting the particle with the composition.

93. The method of any of claims 80 to 86, wherein the immobilized binding reagent and the labeled binding reagent comprise (i) a binding partner of an analyte of interest, (ii) the analyte of interest or an analogue and/or competitor thereof, or (iii) a reactive component capable of binding with species (i) or (ii).

94. The method of any of claims 87 to 92, wherein the immobilized binding reagent and the labeled binding reagent comprise (i) a binding partner of the analyte, (ii) the analyte or an analogue and/or competitor thereof, or (iii) a reactive component capable of binding with species (i) or (ii).

95. The method of any of claims 77 to 94, wherein the electrode is a carbon-based electrode.

96. The method of claim 95, wherein the electrode is a screen-printed carbon ink electrode.

97. The method of any of claims 77 to 96, wherein the ECL is imaged using a camera.

98. The method of any of claims 77 to 97, wherein the ECL is measured using a photodiode.

99. The method of any of claims 77 to 98, wherein the electrode is in a multi-well plate assay consumable.

100. The method of any of claims 77 to 98, wherein the electrode is in a flow cell.

101. The method of any of claims 77 to 98, wherein the electrode is platinum.

102. The composition of any one of claims 1-55, wherein the concentration of the surfactant is between about 0.2 mM and about 10 mM.

103. The composition of claim 102, wherein the concentration of the surfactant is between about 0.5 mM and about 8 mM.

104. The composition of claim 103, wherein the concentration of the surfactant is between about 1.0 mM and about 5 mM.

105. The composition of any one of claims 1-55, wherein the concentration of the surfactant is greater than the critical micellar concentration (cmc) of the surfactant.

106. The kit of any one of claims 60 or 63-76, wherein the concentration of the surfactant is between about 0.2 mM and about 10 mM.

107. The kit of claim 106, wherein the concentration of the surfactant is between about 0.5 mM and about 8 mM.

108. The kit of claim 107, wherein the concentration of the surfactant is between about 1.0 mM and about 5 mM.

109. The kit of any one of claims 60 or 63-76, wherein the concentration of the surfactant is greater than the critical micellar concentration (cmc) of the surfactant.

110. The method of any one of claims 77-101, wherein the concentration of the surfactant is between about 0.2 mM and about 10 mM.

111. The method of claim 110, wherein the concentration of the surfactant is between about 0.5 mM and about 8 mM.

112. The method of claim 111, wherein the concentration of the surfactant is between about 1.0 mM and about 5 mM.

113. The method of any one of claims 77-101, wherein the concentration of the surfactant is greater than the critical micellar concentration (cmc) of the surfactant.

CLAIMS

1. A composition comprising:
(i) about 100 mM to about 175 mM N-butyldiethanolamine (BDEA);
(ii) about 600 mM to about 1200 mM of at least one salt; and
(iii) about 100 mM to about 300 mM of at least one pH buffering component,
wherein the composition further comprises a surfactant, wherein the surfactant is PEG(18) tridecyl ether.

2. The composition of claim 1, wherein the concentration of BDEA is about 125 mM to about 175 mM.

3. The composition of claim 2, wherein the concentration of BDEA is about 150 mM.

4. The composition of claim 1, wherein the at least one salt comprises chloride ion.

5. The composition of claim 4, wherein the at least one salt comprises NaCl, KCl, LiCl or a combination thereof.

6. The composition of claim 5, wherein the at least one salt comprises NaCl and KCl.

7. The composition of claim 6, wherein the concentration of NaCl is about 800 mM and the concentration of KCl is about 50 mM.

8. The composition of claim 1, wherein the pH buffering component is tris(hydroxymethyl)aminomethane (Tris), phosphate, HEPES, glycylglycine, borate, acetate, citrate, or a combination thereof.

9. The composition of claim 8, wherein the pH buffering component is Tris.

10. The composition of claim 1, wherein the concentration of the pH buffering component is about 150 mM to about 250 mM.

11. The composition of claim 1, further comprising TRITON X 100.

12. The composition of claim 1, wherein the concentration of the PEG(18) tridecyl ether is about 0.2 mM to about 10 mM.

13. The composition of claim 11, wherein the concentration of the TRITON X-100 is about 0.2 mM to about 10 mM.

14. The composition of claim 1, wherein:
(i) the concentration of BDEA is about 150 mM;
(ii) the at least one salt comprises a concentration of about 850 mM; and
(iii) the concentration of the pH buffering component is about 200 mM.

15. The composition of claim 14, wherein the at least one salt comprises NaCl and KCl.

16. A composition comprising:
(i) about 150 mM BDEA;
(ii) about 800 mM NaCl;
(iii) about 50 mM KCl;
(iv) about 1 mM PEG(18) tridecyl ether;
(v) about 200 mM Tris-HCl; and
(vi) HCl.