CLAIMS

What is claimed is:

1. A composition comprising:

(i) water;

(ii) one or more oxidizing agents comprising between approximately 0.1 wt% and approximately 1.0 wt% of neat nitric acid; ~~and~~

(iii) one or more acids other than the nitric acid; and

(iv) one or more halogen ion source.

~~**2.** A composition consisting essentially of:~~

~~**(i)** water;~~

~~**(ii)** one or more oxidizing agents; and~~

~~**(iii)** one or more acids.~~

~~**3.** A composition consisting of:~~

~~**(i)** water;~~

~~**(ii)** one or more oxidizing agents; and~~

~~**(iii)** one or more acids.~~

~~**4.** The composition of any of claims 1-3, further comprising **(iv)** one or more halogen ion source.~~

~~**5.**~~**2.** The composition of ~~any of claims 1-3~~claim 1, further comprising **(v)** one or more chelating agent.

~~**6.** The composition of any of claims 1-3, further comprising **(iv)** one or more halogen ion source and **(v)** one or more chelating agent.~~

~~**7.** The composition of any of claims 1-3, wherein the one or more acids comprises a halogen ion source.~~

~~**8.**~~**3.** The composition of ~~any of claims 1-3~~claim 1, wherein the one or more oxidizing agents further comprises one or more of peroxomonosulfate, perborate, perchlorate, perchloric acid, peracetate anions, ~~sulfuric acid,~~ periodate, persulfate, permanganate, chromate, dichromate, benzoquinones~~, nitric acid~~ and an amine-N-oxide.

~~**9.**~~**4.** The composition of ~~any of claims 1-3~~claim 1, wherein the one or more oxidizing agents further comprises one or more of ammonium persulfate ~~(APS)~~, 2,5-dihydroxy-1,4-benzoquinone, nitrosylsulfuric acid, and pyridine N-oxide, 4-methylmorpholine-N-oxide.

~~**10.**~~**5.** The composition of ~~any of claims 1-3~~claim 1, wherein the one or more acids comprises one or more of sulfuric acid, hydrochloric acid, ~~alkyl sulfonic acid, such as,~~ methane sulfonic

acid, ~~alkyl benzyl sulfonic acid, such as,~~ 4-methylbenzenesulfonic acid, hydrobromic acid, citric acid, malonic acid, hydrofluoric acid, acetic acid, phosphoric acid and hydroiodic acid.

~~**11.** The composition of any of claims 1-3, wherein the one or more oxidizing agents comprises nitric acid.~~

~~**12.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists essentially of nitric acid.~~

~~**13.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists of nitric acid.~~

~~**14.** The composition of any of claims 1-3, wherein the one or more oxidizing agents comprises between approximately 0.1 wt% and approximately 1.0 wt% of neat nitric acid.~~

~~**15.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists essentially of approximately 0.1 wt% and approximately 1.0 wt% of neat nitric acid.~~

~~**16.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists of approximately 0.1 wt% and approximately 1.0 wt% of neat nitric acid.~~

~~**17.** The composition of any of claims 1-3, wherein the one or more oxidizing agents comprises approximately 0.9 wt% of neat nitric acid.~~

~~**18.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists essentially of approximately 0.9 wt% of neat nitric acid.~~

~~**19.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists of approximately 0.9 wt% of neat nitric acid.~~

~~**20.** The composition of any of claims 1-3, wherein the one or more oxidizing agents comprises approximately 0.6 wt% of neat nitric acid.~~

~~**21.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists essentially of approximately 0.6 wt% of neat nitric acid.~~

~~**22.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists of approximately 0.6 wt% of neat nitric acid.~~

~~**23.** The composition of any of claims 1-3, wherein the one or more oxidizing agents comprises 2,5-dihydroxy-1,4-benzoquinone.~~

~~**24.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists essentially of 2,5-dihydroxy-1,4-benzoquinone.~~

~~**25.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists of 2,5-dihydroxy-1,4-benzoquinone.~~

~~**26.** The composition of any of claims 1-3, wherein the one or more oxidizing agents comprises approximately 0.01 wt% of 2,5-dihydroxy-1,4-benzoquinone.~~

~~**27.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists essentially of approximately 0.01 wt% of 2,5-dihydroxy-1,4-benzoquinone.~~

~~**28.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists of approximately 0.01 wt% of 2,5-dihydroxy-1,4-benzoquinone.~~

~~**29.** The composition of any of claims 1-3, wherein the one or more oxidizing agents comprises ammonium persulfate.~~

~~**30.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists essentially of and ammonium persulfate.~~

~~**31.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists of ammonium persulfate.~~

~~**32.** The composition of any of claims 1-3, wherein the one or more oxidizing agents comprises approximately 1.0 wt% of ammonium persulfate.~~

~~**33.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists essentially of approximately 1.0 wt% of ammonium persulfate.~~

~~**34.** The composition of any of claims 1-3, wherein the one or more oxidizing agents consists of approximately 1.0 wt% of ammonium persulfate.~~

~~**35.** The composition of any of claims 1-3, wherein a total wt% of neat acid in the composition is approximately 15 wt% to approximately 50 wt%.~~

~~**36.**__**6.**__ The composition of ~~any of claims 1-3~~claim 1, wherein a total wt% of neat acid in the composition is approximately 30 wt% to approximately 45 wt%.

~~**37.**__**7.**__ The composition of ~~any of claims 1-3~~claim 1, wherein a total wt% of neat acid in the composition is approximately 35 wt% to approximately 45 wt%.

~~**38.** The composition of any of claims 1-3, wherein a total wt% of neat acid in the composition is approximately 30 wt% to approximately 40 wt%.~~

~~**39.** The composition of any of claims 1-3, wherein a total wt% of neat acid in the composition is approximately 35 wt% to approximately 40 wt%.~~

~~**40.** The composition of any of claims 1-3, wherein a total wt% of neat acid in the composition is approximately 40 wt% to approximately 45 wt%.~~

~~**41.** The composition of any of claims 1-3, wherein the one or more acids comprises sulfuric acid.~~

~~**42.** The composition of any of claims 1-3, wherein the one or more acids consists essentially of sulfuric acid.~~

~~**43.** The composition of any of claims 1-3, wherein the one or more acids consists of sulfuric acid.~~

~~**44.**~~**8.** The composition of ~~any of claims 1-3~~claim 1, wherein the one or more acids comprises approximately ~~38.8~~39.2 wt% of neat sulfuric acid.

~~**45.** The composition of any of claims 1-3, wherein the one or more acids consists essentially of approximately 38.8 wt% of neat sulfuric acid.~~

~~**46.** The composition of any of claims 1-3, wherein the one or more acids consists of approximately 38.8 wt% of neat sulfuric acid.~~

~~**47.** The composition of any of claims 1-3, wherein the one or more acids comprises hydrochloric acid.~~

~~**48.** The composition of any of claims 1-3, wherein the one or more acids consists essentially of hydrochloric acid.~~

~~**49.** The composition of any of claims 1-3, wherein the one or more acids consists of hydrochloric acid.~~

~~**50.** The composition of any of claims 1-3, wherein the one or more acids comprises approximately 4.725 wt% of neat hydrochloric acid.~~

~~**51.** The composition of any of claims 1-3, wherein the one or more acids consists essentially of approximately 4.725 wt% of hydrochloric acid.~~

~~**52.** The composition of any of claims 1-3, wherein the one or more acids consists of approximately 4.725 wt% of hydrochloric acid.~~

~~**53.**~~**9.** The composition of ~~any of claims 1-3~~claim 1, wherein the one or more acids comprises approximately 3.5 wt% of neat hydrochloric acid.

~~**54.** The composition of any of claims 1-3, wherein the one or more acids consists essentially of approximately 3.5 wt% of hydrochloric acid.~~

~~**55.** The composition of any of claims 1-3, wherein the one or more acids consists of approximately 3.5 wt% of hydrochloric acid.~~

~~**56.**~~**10.** The composition of ~~any of claims 1-3~~claim 1, wherein the one or more acids comprises sulfuric acid and hydrochloric acid.

~~**57.** The composition of any of claims 1-3, wherein the one or more acids consists essentially of sulfuric acid and hydrochloric acid.~~

~~**58.** The composition of any of claims 1-3, wherein the one or more acids consists of sulfuric acid and hydrochloric acid.~~

~~**59.** The composition of any of claims 1-3, wherein the one or more acids comprises approximately 38.8 wt% of neat sulfuric acid and of approximately 4.725 wt% of neat hydrochloric acid.~~

~~**60.** The composition of any of claims 1-3, wherein the one or more acids consists essentially of approximately 38.8 wt% of neat sulfuric acid and of approximately 4.725 wt% of neat hydrochloric acid.~~

~~**61.** The composition of any of claims 1-3, wherein the one or more acids consists of approximately 38.8 wt% of neat sulfuric acid and of approximately 4.725 wt% of neat hydrochloric acid.~~

~~**62.**~~**11.** The composition of ~~any of claims 1-3~~claim 1, wherein the one or more acids comprises approximately ~~38.8~~39.2 wt% of neat sulfuric acid and of approximately 3.5 wt% of neat hydrochloric acid.

~~**63.** The composition of any of claims 1-3, wherein the one or more acids consists essentially of approximately 38.8 wt% of neat sulfuric acid and of approximately 3.5 wt% of neat hydrochloric acid.~~

~~**64.** The composition of any of claims 1-3, wherein the one or more acids consists of approximately 38.8 wt% of neat sulfuric acid and of approximately 3.5 wt% of neat hydrochloric acid.~~

~~**65.** The composition of any of claims 1-3, wherein the composition comprises water, sulfuric acid and nitric acid.~~

~~**66.** The composition of any of claims 1-3, wherein the composition consists essentially of water, sulfuric acid and nitric acid.~~

~~**67.** The composition of any of claims 1-3, wherein the composition consists of water, sulfuric acid and nitric acid.~~

~~**68.**~~**12.** The composition of ~~any of claims 1-3~~claim 1, wherein the composition comprises water, approximately 33.5 wt% to approximately 50 wt% of neat sulfuric acid and approximately 0.9 wt% of neat nitric acid.

~~**69.** The composition of any of claims 1-3, wherein the composition consists essentially of water, approximately 33.5 wt% to approximately 50 wt% of neat sulfuric acid and approximately 0.9 wt% of neat nitric acid.~~

~~**70.** The composition of any of claims 1-3, wherein the composition consists of water, approximately 33.5 wt% to approximately 50 wt% of neat sulfuric acid and approximately 0.9 wt% of neat nitric acid.~~

~~**71.** The composition of claim 1, wherein the composition comprises water, hydrochloric acid and nitric acid.~~

~~**72.** The composition of claim 2, wherein the composition consists essentially of water, hydrochloric acid and nitric acid.~~

~~**73.** The composition of claim 3, wherein the composition consists of water, hydrochloric acid and nitric acid.~~

~~**74.**__**13.**__ The composition of claim 1, wherein the composition comprises water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid and approximately 0.6 wt% to approximately 0.9 wt% of neat nitric acid.

~~**75.** The composition of claim 2, wherein the composition consists essentially of water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid and approximately 0.6 wt% to approximately 0.9 wt% of neat nitric acid.~~

~~**76.** The composition of claim 3, wherein the composition consists of water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid and approximately 0.6 wt% to approximately 0.9 wt% of neat nitric acid.~~

~~**77.** The composition of claim 1, wherein the composition comprises water, hydrochloric acid, nitric acid and methane sulfonic acid.~~

~~**78.** The composition of claim 2, wherein the composition consists essentially of water, hydrochloric acid, nitric acid and methane sulfonic acid.~~

~~**79.** The composition of claim 3, wherein the composition consists of water, hydrochloric acid, nitric acid and methane sulfonic acid.~~

~~**80.**__**14.**__ The composition of claim 1, wherein the composition comprises water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid, approximately 0.6 wt% to approximately 0.9 wt% of neat nitric acid and approximately ~~40 wt% of methane sulfonic acid~~33.5 wt% to approximately 50 wt% of neat sulfuric acid.

~~**81.** The composition of claim 2, wherein the composition consists essentially of water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid, approximately 0.6 wt% to approximately 0.9 wt% of neat nitric acid and approximately 40 wt% of methane sulfonic acid.~~

~~**82.** The composition of claim 3, wherein the composition consists of water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid, approximately 0.6 wt% to approximately 0.9 wt% of neat nitric acid and approximately 40 wt% of methane sulfonic acid.~~

~~**83.** The composition of claim 1, wherein the composition comprises water, hydrochloric acid, nitric acid, methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.~~

84. The composition of claim 2, wherein the composition consists essentially of water, hydrochloric acid, nitric acid, methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.

85. The composition of claim 3, wherein the composition consists of water, hydrochloric acid, nitric acid, methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.

86. The composition of claim 1, wherein the composition comprises water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid, approximately 0.6 wt% to approximately 0.9 wt% of neat nitric acid, approximately 40 wt% of methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.

87. The composition of claim 2, wherein the composition consists essentially of water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid, approximately 0.6 wt% to approximately 0.9 wt% of neat nitric acid, approximately 40 wt% of methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.

88. The composition of claim 3, wherein the composition consists of water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid, approximately 0.6 wt% to approximately 0.9 wt% of neat nitric acid, approximately 40 wt% of methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.

89. The composition of claim 1, wherein the composition comprises water, hydrochloric acid, methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.

90. The composition of claim 2, wherein the composition consists essentially of water, hydrochloric acid, methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.

91. The composition of claim 3, wherein the composition consists of water, hydrochloric acid, methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.

92. The composition of claim 1, wherein the composition comprises water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid, approximately 40 wt% of methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.

93. The composition of claim 2, wherein the composition consists essentially of water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid, approximately 40 wt% of methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.

94. The composition of claim 3, wherein the composition consists of water, approximately 3.0 wt% to approximately 5.0 wt% of neat hydrochloric acid, approximately 40 wt% of methane sulfonic acid and 2,5-dihydroxy-1,4-benzoquinone.

95. The composition of claim 1, wherein the composition comprises water, sulfuric acid, hydrochloric acid and nitric acid.

~~**96.** The composition of claim 2, wherein the composition consists essentially of water, sulfuric acid, hydrochloric acid and nitric acid.~~

~~**97.** The composition of claim 3, wherein the composition consists of water sulfuric acid, hydrochloric acid and nitric acid.~~

~~**98.**~~**15.** The composition of claim 1, wherein the composition comprises water and approximately 40 wt% to approximately 45 wt% combined of neat sulfuric acid, neat hydrochloric acid and neat nitric acid.

~~**99.** The composition of claim 2, wherein the composition consists essentially of water and approximately 40 wt% to approximately 45 wt% combined of neat sulfuric acid, neat hydrochloric acid and neat nitric acid.~~

~~**100.** The composition of claim 3, wherein the composition consists of water and approximately 40 wt% to approximately 45 wt% combined of neat sulfuric acid, neat hydrochloric acid and neat nitric acid.~~

~~**101.**~~**16.** The composition of claim 1, wherein the composition comprises water and approximately 43 wt% to approximately 45 wt% combined of neat sulfuric acid, neat hydrochloric acid and neat nitric acid.

~~**102.** The composition of claim 2, wherein the composition consists essentially of water and approximately 43 wt% to approximately 45 wt% combined of neat sulfuric acid, neat hydrochloric acid and neat nitric acid.~~

~~**103.** The composition of claim 3, wherein the composition consists of water and approximately 43 wt% to approximately 45 wt% combined of neat sulfuric acid, neat hydrochloric acid and neat nitric acid.~~

~~**104.** The composition of claim 1, wherein the composition comprises water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid and approximately 0.6 wt% of neat nitric acid.~~

~~**105.** The composition of claim 2, wherein the composition consists essentially of water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid and approximately 0.6 wt% of neat nitric acid.~~

~~**106.** The composition of claim 3, wherein the composition consists of water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid and approximately 0.6 wt% of neat nitric acid.~~

107. The composition of claim 1, wherein the composition comprises water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid and approximately 0.9 wt% of neat nitric acid.

108. The composition of claim 2, wherein the composition consists essentially of water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid and approximately 0.9 wt% of neat nitric acid.

109. The composition of claim 3, wherein the composition consists of water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid and approximately 0.9 wt% of neat nitric acid.

110. The composition of claim 1, wherein the composition comprises water, approximately 38.8 wt% of neat sulfuric acid, approximately 3.5 wt% of neat hydrochloric acid and approximately 0.6 wt% of neat nitric acid.

111. The composition of claim 2, wherein the composition consists essentially of water, approximately 38.8 wt% of neat sulfuric acid, approximately 3.5 wt% of neat hydrochloric acid and approximately 0.6 wt% of neat nitric acid.

112. The composition of claim 3, wherein the composition consists of water, approximately 38.8 wt% of neat sulfuric acid, approximately 3.5 wt% of neat hydrochloric acid and approximately 0.6 wt% of neat nitric acid.

113.17. The composition of claim 1, wherein the composition comprises water, approximately 38.839.2 wt% of neat sulfuric acid, approximately 3.5 wt% of neat hydrochloric acid and approximately 0.9 wt% of neat nitric acid.

114.18. The composition of claim 2claim 1, wherein the composition consists essentially of water, approximately 38.839.2 wt% of neat sulfuric acid, approximately 3.5 wt% of neat hydrochloric acid and approximately 0.9 wt% of neat nitric acid.

115.19. The composition of claim 3claim 1, wherein the composition consists of water, approximately 38.839.2 wt% of neat sulfuric acid, approximately 3.5 wt% of neat hydrochloric acid and approximately 0.9 wt% of neat nitric acid.

116. The composition of claim 1, wherein the composition comprises water, sulfuric acid, hydrochloric acid, nitric acid and ammonium chloride.

117. The composition of claim 2, wherein the composition consists essentially of water, sulfuric acid, hydrochloric acid, nitric acid and ammonium chloride.

118. The composition of claim 3, wherein the composition consists of water sulfuric acid, hydrochloric acid, nitric acid and ammonium chloride.

~~**119.** The composition of claim 1, wherein the composition comprises water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid, approximately 0.6 wt% of neat nitric acid and ammonium chloride.~~

~~**120.** The composition of claim 2, wherein the composition consists essentially of water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid, approximately 0.6 wt% of neat nitric acid and ammonium chloride.~~

~~**121.** The composition of claim 3, wherein the composition consists of water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid, approximately 0.6 wt% of neat nitric acid and ammonium chloride.~~

~~**122.** The composition of claim 1, wherein the composition comprises water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid, approximately 0.9 wt% of neat nitric acid and ammonium chloride.~~

~~**123.** The composition of claim 2, wherein the composition consists essentially of water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid, approximately 0.9 wt% of neat nitric acid and ammonium chloride.~~

~~**124.** The composition of claim 3, wherein the composition consists of water, approximately 38.8 wt% of neat sulfuric acid, approximately 4.725 wt% of neat hydrochloric acid, approximately 0.9 wt% of neat nitric acid and ammonium chloride.~~

~~**125.**~~**20.** The composition of ~~any of claims 4 or 6~~claim 1, wherein the one or more halogen ion source comprises one or more of hydrobromic acid, hydroiodic acid, hydrogen chloride, hydrofluoric acid, hydrochloric acid, ammonium chloride, ammonium bromide, ammonium fluoride and ammonium iodide.

~~**126.**~~**21.** The composition of ~~any of claims 4 or 6~~claim 1, wherein the one or more halogen ion source comprises ~~consists essentially of~~ one or more of ~~hydrobromic acid, hydroiodic acid, hydrogen chloride, hydrofluoric acid, hydrochloric acid,~~ ammonium chloride, ammonium bromide, ammonium fluoride and ammonium iodide.

~~**127.** The composition of any of claims 4 or 6, wherein the one or more halogen ion source consists of one or more of hydrobromic acid, hydroiodic acid, hydrogen chloride, hydrofluoric acid, hydrochloric acid, ammonium chloride, ammonium bromide, ammonium fluoride and ammonium iodide.~~

~~**128.** The composition of any of claims 4 or 6, wherein the one or more halogen ion source comprises approximately 2 wt% of ammonium chloride.~~

129. The composition of any of claims 4 or 6, wherein the one or more halogen ion source consists essentially of approximately 2 wt% ammonium chloride.

130. The composition of any of claims 4 or 6, wherein the one or more halogen ion source consists of approximately 2 wt% ammonium chloride.

131. The composition of any of claims 1-130, wherein the composition has a Ni etch rate of approximately 200 or greater.

132. The composition of any of claims 1-130, wherein the composition has a Ni etch rate of approximately 300 or greater.

133. The composition of any of claims 1-130, wherein the composition has a Ni etch rate of approximately 400 or greater.

134. The composition of any of claims 1-130, wherein the composition has a Ni etch rate of approximately 500 or greater.

135. The composition of any of claims 1-130, wherein the composition has a Ni etch rate of approximately 600 or greater.

136. The composition of any of claims 1-130, wherein the composition has a Ni etch rate of approximately 200 to approximately 700.

137. The composition of any of claims 1-130, wherein the composition has a Ni etch rate of approximately 300 to approximately 700.

138. The composition of any of claims 1-130, wherein the composition has a Ni etch rate of approximately 400 to approximately 700.

139. The composition of any of claims 1-130, wherein the composition has a Ni etch rate of approximately 500 to approximately 700.

140. The composition of any of claims 1-130, wherein the composition has a Ni etch rate of approximately 600 to approximately 700.

141. The composition of any of claims 1-130, wherein the composition has an Fe_2O_3 solubility of approximately 2 mg/100 ml or greater.

142. The composition of any of claims 1-130, wherein the composition has an Fe_2O_3 solubility of approximately 3 mg/100 ml or greater.

143. The composition of any of claims 1-130, wherein the composition has an Fe_2O_3 solubility of approximately 4 mg/100 ml or greater.

144. The composition of any of claims 1-130, wherein the composition has an Fe_2O_3 solubility of approximately 5 mg/100 ml or greater.

~~**145.** The composition of any of claims 1-130, wherein the composition has an Fe_2O_3 solubility of approximately 6 mg/100 ml or greater.~~

~~**146.** The composition of any of claims 1-130, wherein the composition has an Fe_2O_3 solubility of approximately 7 mg/100 ml or greater.~~

~~**147.** The composition of any of claims 1-130, wherein the composition has an Fe_2O_3 solubility of approximately 8 mg/100 ml or greater.~~

~~**148.** The composition of any of claims 1-130, wherein the composition has an Fe_2O_3 solubility of approximately 9 mg/100 ml or greater.~~

~~**149.** The composition of any of claims 1-130, wherein the composition has an Fe_2O_3 solubility of approximately 10 mg/100 ml or greater.~~

~~**150.** The composition of any of claims 1-130, wherein the composition has an Fe_2O_3 solubility of approximately 11 mg/100 ml or greater.~~

~~**151.**~~**22.** The composition of ~~any of claims 1-130~~claim 1, wherein the composition has an Fe_2O_3 solubility of approximately 2 mg/100 ml or greater to approximately 11 mg/100 ml or greater.

~~**152.** The composition of any of claims 1-130, wherein the composition has an Fe_2O_3 solubility of approximately 5 mg/100 ml or greater to approximately 10 mg/100 ml or greater.~~

~~**153.** A method for fabricating a semiconductor device on a semiconductor wafer comprising:~~

~~**a.** forming one or more layers over a silicon substrate wherein at least one of the layers comprises a Ni-containing layer; and~~

~~**b.** removing said Ni-containing layer by contacting said Ni-containing layer with a composition of any of claims 1-152.~~

~~**154.**~~**23.** A method of removing a metal-containing layer of a pellicle structure comprising the steps of:

a. providing a semiconductor device comprising a substrate, an EUV mask and a metal-containing EUV mask-protecting structure comprising nickel;

b. exposing the semiconductor device to EUV radiation; and

c. removing the metal-containing EUV mask-protecting structure by contacting said semiconductor device to the composition of ~~any of claims 1-152~~claim 1.

~~**155.** The method of claim 153 further comprising the step of performing a selective dry etch process on at least a portion of the semiconductor device prior to removing the metal-containing EUV mask-protecting structure.~~

~~**156.** The method of claim 154, wherein the metal-containing EUV mask-protecting structure comprises nickel.~~

~~**157.** The method of claim 4 wherein the metal-containing EUV mask-protecting structure comprises a metal-containing heat dissipation layer.~~

~~**158.** The method of claim 154, wherein the metal-containing EUV mask-protecting structure comprises a metal-containing linking layer.~~

~~**159.** The method of claim 154, wherein the metal-containing EUV mask-protecting structure comprises one or metals deposited via atomic layer deposition (ALD), e-beam evaporation, chemical vapor deposition (CVD) or electroplating.~~

~~**160.** The method of claim 154, wherein the semiconductor device further comprises at least one of a sacrificial layer, an insulation layer, a passivation layer, a low-k layer, a metal-containing layer or a barrier layer (i) between the substrate and the EUV mask or (ii) as part of the EUV mask protective structure.~~

~~**161.** The method of claim 154, wherein the metal-containing EUV mask-protecting structure comprises at least one of a sacrificial layer, an insulation layer, a passivation layer, a graphene layer, an EUV transmission layer; a linking layer and a heat dissipation layer.~~