WHAT IS CLAIMED IS:

1. An etching composition, comprising:

1) at least one oxidizing agent in an amount of from about 0.1% to about 30% by weight of the composition;

2) at least one chelating agent in an amount of from about 0.01% to about 1% by weight of the composition;

3) at least one organic solvent in an amount of from about 1% to about 30% by weight of the composition;

4) at least one amine compound comprising a diamine, an alkanolamine, or a quaternary ammonium compound, the at least one amine compound comprising 1 to 6 carbon atoms and being in an amount of from about 0.5% to about 5% by weight of the composition, and the alkanolamine is of the formula (II):

$$HO\text{-}R_1\text{-}NH_2 \quad (II),$$

in which R_1 is a linear or branched C_2-C_6 alkyl;

the quaternary ammonium compound not being tetramethylammonium hydroxide; and

5) water;

wherein the composition has a pH from about 6.5 to about 9.5.

2. The composition of claim 1, wherein the quaternary ammonium compound is a salt.

3. The composition of claim 1 or 2, wherein the quaternary ammonium compound is tetramethylammonium fluoride.

4. The composition of any one of claims 1 to 3, wherein the composition has a pH from about 7 to about 9.5.

5. The composition of any one of claims 1 to 4, wherein the at least one oxidizing agent comprises hydrogen peroxide.

6. The composition of any one of claims 1 to 5, wherein the at least one oxidizing agent is in an amount of from about 1% to about 18% by weight of the composition.

7. The composition of any one of claims 1 to 6, wherein the at least one chelating agent comprises polyaminopolycarboxylic acid.

8. The composition of claim 7, wherein the polyaminopolycarboxylic acid is selected from the group consisting of mono- or polyalkylene polyamine polycarboxylic acids, polyaminoalkane polycarboxylic acids, polyaminoalkanol polycarboxylic acids, and hydroxyalkylether polyamine polycarboxylic acids.

9. The composition of claim 8, wherein the polyaminopolycarboxylic acid is selected from the group consisting of butylenediaminetetraacetic acid, diethylenetriaminepentaacetic acid, ethylenediaminetetrapropionic acid, triethylenetetraminehexaacetic acid, 1,3-diamino-2-hydroxypropane-N,N,N',N'-tetraacetic acid, propylenediaminetetraacetic acid, ethylenediaminetetraacetic acid, trans-1,2-diaminocyclohexane tetraacetic acid, ethylenediamine diacetic acid, ethylenediamine dipropionic acid, 1,6-hexamethylene-diamine-N,N,N',N'-tetraacetic acid, N,N-bis(2-hydroxybenzyl)ethylenediamine-N,N-diacetic acid, diaminopropane tetraacetic acid, iminodiacetic acid; 1,4,7,10-tetraazacyclododecane-tetraacetic acid, diaminopropanol tetraacetic acid, and (hydroxyethyl)ethylenediaminetriacetic acid.

10. The composition of any one of claims 1 to 9, wherein the at least one chelating agent is in an amount of from about 0.1% to about 0.5% by weight of the composition.

11. The composition of any one of claims 1 to 10, further comprising at least one metal corrosion inhibitor.

12. The composition of claim 11, wherein the at least one metal corrosion inhibitor comprises a substituted or unsubstituted benzotriazole.

13. The composition of claim 12, wherein the at least one metal corrosion inhibitor comprises a benzotriazole optionally substituted by at least one substituent selected from the group consisting of alkyl groups, aryl groups, halogen groups, amino groups, nitro groups, alkoxy groups, and hydroxyl groups.

14. The composition of claim 12, wherein the substituted or unsubstituted benzotriazole is selected from the group consisting of benzotriazole, 5-aminobenzotriazole, 1-hydroxybenzotriazole, 5-phenylthiol-benzotriazole, 5-chlorobenzotriazole, 4-chlorobenzotriazole, 5-bromobenzotriazole, 4-bromobenzotriazole, 5-fluorobenzotriazole, 4-fluorobenzotriazole, naphthotriazole, tolyltriazole, 5-phenyl-benzotriazole, 5-nitrobenzotriazole, 4-nitrobenzotriazole, 2-(5-amino-pentyl)-benzotriazole, 1-amino-benzotriazole, 5-methyl-1H-benzotriazole, benzotriazole-5-carboxylic acid, 4-methylbenzotriazole, 4-ethylbenzotriazole, 5-ethylbenzotriazole, 4-propylbenzotriazole, 5-propylbenzotriazole, 4-isopropylbenzotriazole, 5-isopropylbenzotriazole, 4-n-butylbenzotriazole, 5-n-butylbenzotriazole, 4-isobutylbenzotriazole, 5-isobutylbenzotriazole, 4-pentylbenzotriazole, 5-pentylbenzotriazole, 4-hexylbenzotriazole, 5-hexylbenzotriazole, 5-methoxybenzotriazole, 5-hydroxybenzotriazole, dihydroxypropylbenzotriazole, 1-[N,N-bis(2-ethylhexyl)aminomethyl]-benzotriazole, 5-t-butyl benzotriazole, 5-(1',1'- dimethylpropyl)-benzotriazole, 5-(1',1',3'-trimethylbutyl)benzotriazole, 5-n-octyl benzotriazole, and 5-(1',1',3',3'-tetramethylbutyl)benzotriazole.

15. The composition of any one of claims 11 to 14, wherein the at least one metal corrosion inhibitor is in an amount of from about 0.1% to about 0.5% by weight of the composition.

16. The composition of any one of claims 1 to 14, wherein the at least one organic solvent comprises a solvent selected from the group consisting of water soluble alcohols, water soluble ketones, water soluble esters, and water soluble ethers.

17. The composition of any one of claims 1 to 16, wherein the composition comprises from about 5% to about 25% by weight of the at least one organic solvent.

18. The composition of any one of claims 1 to 17, wherein the at least one amine compound comprises ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, ethanolamine, or tetramethylammonium fluoride.

19. The composition of any one of claims 1 to 18, wherein the at least one amine compound is in an amount of from about 1% to about 5% by weight of the composition.

20. The composition of any one of claims 1 to 19, wherein the water is in an amount of from about 35% to about 98% by weight of the composition.

21. The composition of any one of claims 1 to 20, further comprising at least one acid.

22. The composition of claim 21, wherein the at least one acid comprises an inorganic acid or a sulfonic acid.

23. The composition of claim 21 or 22, wherein the at least one acid is in an amount of from about 0.1% to about 5% by weight of the composition.

24. The composition of any one of claims 1 to 23, wherein the composition is free of a polymer, an imine, a hydrazine, or an amidine.

25. A method, comprising contacting a semiconductor substrate containing TiSiN features with an etching composition to remove the TiSiN features;

wherein the composition comprises at least one oxidizing agent, at least one chelating agent, at least one organic solvent, at least one amine compound comprising 1 to 6 carbon atoms, and water, and the composition has a pH from about 6.5 to about 9.5.

26. The method of claim 25, further comprising rinsing the semiconductor substrate with a rinse solvent after the contacting step.

27. The method of claim 26, further comprising drying the semiconductor substrate after the rinsing step.

28. The method of any one of claims 25 to 27, wherein the method does not substantially remove HfOx in the semiconductor substrate.