Claims

1. A cleaning composition for micro-electronics applications comprising 0.05% to 5.0 % by weight of a bifluoride compound, 0.01% to 5% by weight of a pH-stabilizing compatibility enhancer, 5% to 90% by weight of an organic solvent, and 5% to 90% water, wherein a pH of said cleaning composition is less than or equal to 5.5,
wherein said pH-stabilizing compatibility enhancer is a polyprotic acid, or salt thereof.

2. The cleaning composition of claim 1 comprising 0.05% to 1.0 % by weight of a bifluoride compound, 0.05% to 3% by weight of a pH-stabilizing compatibility enhancer, 10% to 70% by weight of an organic solvent, and 10% to 50% water.

3. The cleaning composition of claim 1 comprising 0.1% to 0.5 % by weight of a bifluoride compound, 0.1% to 1.0% by weight of a pH-stabilizing compatibility enhancer, 20% to 60% by weight of an organic solvent, and 20% to 40% water.

4. The cleaning composition of claim 1 wherein a pH of said cleaning composition is less than or equal to 5.0.

5. The cleaning composition of claim 1 wherein a pH of said cleaning compositions is less than or equal to 4.5.

6. The cleaning composition of claim 1 further comprising a co-solvent selected from alcohols, alcohol-ethers, and ethers.

7. The cleaning composition of claim 6 wherein said co-solvent is ethylene glycol, diethylene glycol, or a combination thereof.

8. The cleaning composition of claim 1 wherein said bifluoride compound is selected from the group consisting of ammonium bifluoride, alkylammonium bifluoride, potassium bifluoride, and alkali metal bifluorides.

9. The cleaning composition of claim 8 wherein said bifluoride compound is ammonium bifluoride.

10. The cleaning composition of claim 1 wherein said pH-stabilizing compatibility enhancer is selected from the group of citric acid, ammonium citrate monobasic, ammonium citrate dibasic, ammonium citrate tribasic, phosphoric acid, ammonium phosphate monobasic, ammonium phosphate dibasic, ammonium phosphate tribasic, ascorbic acid, ammonium ascorobate monobasic, ammonium ascorobate dibasic, aminotrymethylenephosphonic acid, and mixtures thereof.

11. The cleaning composition of claim 1 wherein said organic solvent is a sulfide or an amide.

12. The cleaning composition of claim 11 wherein said organic solvent is selected from dimethyl sulfoxide, N-methyl pyrrolidone (NMP), N-ethyl pyrrolidone (NEP), N-(2-hydroxyethyl)-2-pyrrolidone (HEP), N-(2-hydroxyethyl)morpholine, dimethyl 2-piperidone (DMPD), dimethyl acetamide, formamide, and mixtures thereof.

13. The cleaning composition of claim 1 further comprising another fluoride source.

14. The cleaning composition of claim 13 wherein said another fluoride source is a fluoride salt.

15. The cleaning composition of claim 1 further comprising a corrosion control agent.

16. The cleaning composition of claim 1 further comprising a surfactant.

17. A method of cleaning a micro-electronic material comprising contacting said microelectronic material with a cleaning composition comprising: 0.05% to 5.0 % by weight of a bifluoride compound, 0.01% to 5% by weight of a pH-stabilizing compatibility enhancer, 5% to 90% by weight of an organic solvent, and 5% to 90% water,

wherein a pH of said cleaning composition is less than or equal to 5.5,

wherein said pH-stabilizing compatibility enhancer is a polyprotic acid, or salt thereof.