CLAIMS

We claim:

1. A curable fluorine-containing elastomer composition ~~comprising~~formed by combining

a first unfilled curable perfluoropolymer comprising tetrafluoroethylene, a first perfluoroalkylvinyl ether and at least one first cure site monomer having at least one cure site, wherein tetrafluoroethylene is present in the first curable perfluoropolymer in an amount of at least about 50 mole percent;

a second curable perfluoropolymer comprising tetrafluoroethylene, a second perfluoroalkylvinyl ether and at least one second cure site monomer having at least one cure site, wherein the second curable perfluoropolymer comprises fluoroplastic particles ~~therein~~ in a matrix of the second curable perfluoropolymer, wherein such fluoroplastic has a functional curesite and is incorporated into the second curable perfluoropolymer matrix; and

at least one curative.

2. The curable fluorine-containing elastomer composition according to claim 1, wherein the first curable perfluoropolymer comprises at least about 60 mole percent tetrafluoroethylene.

3. The curable fluorine-containing elastomer composition according to claim 2, wherein the first curable perfluoropolymer comprises at least about 70 mole percent tetrafluoroethylene.

4. The curable fluorine-containing elastomer composition according to claim 1, wherein the first curable perfluoropolymer comprises about 60 to about 95 mole percent tetrafluoroethylene.

5. The curable fluorine-containing elastomer composition according to claim 1, wherein the composition comprises the first curable perfluoropolymer and the second curable perfluoropolymer in a ratio of about 25 to about 75 mole percent to about 75 to about 25 mole percent.

6. The curable fluorine-containing elastomer composition according to claim 5, wherein the composition comprises the first curable perfluoropolymer and the second curable perfluoropolymer in a ratio of about 40 to about 60 mole percent to about 60 to about 40 mole percent.

7. The curable fluorine-containing elastomer composition according to claim 1, wherein the composition comprises the first curable perfluoropolymer and the second curable perfluoropolymer in a ratio of about 50 to about 50.

8. The curable fluorine-containing elastomer composition according to claim 1, wherein each of the at least one cure site monomers is present in an amount of about 0.01 to about 10

mole percent respectively in each of the first curable perfluoropolymer and the second curable perfluoropolymer.

9. The curable fluorine-containing elastomer composition according to claim 1, wherein the at least one curative is present in an amount of about 0.01 to about 5 parts by weight per 100 parts by weight of the perfluoropolymers in the composition.

10. The curable fluorine-containing elastomer composition according to claim 9, wherein the at least one curative is present in an amount of about 0.01 to about 2 parts by weight per 100 parts by weight of the perfluoropolymers in the composition.

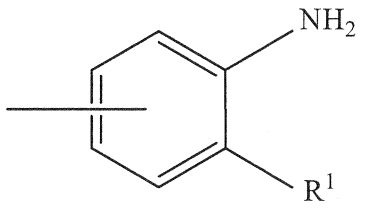
11. The curable fluorine-containing elastomer composition according to claim 1, wherein the at least one cure site in the at least one cure site monomer in the first curable perfluoropolymer is a nitrogen-containing cure site.

12. The curable fluorine-containing elastomer composition according to claim 1, wherein the at least one cure site in the at least one cure site monomer in the first curable perfluoropolymer is selected from the group consisting of cyano, carboxyl, carbonyl, alkoxycarbonyl, and combinations thereof.

13. The curable fluorine-containing elastomer composition according to claim 1, wherein the fluoroplastic particles are present in the second curable perfluoropolymer as a result of melt-blending or blending during latex polymerization.

14. The curable fluorine-containing elastomer composition according to claim 13, wherein the second curable perfluoropolymer comprises fluoroplastic particles as a result of blending during latex polymerization, and the fluoroplastic particles comprise a nitrogen-containing cure site monomer, and wherein the functional curesite of the fluoroplastic in the matrix of the second curable ~~fluoropolymer~~ perfluoropolymer is a cyano curesite and the curesite monomer of the second cureable perfluoropolymer has~~comprises a cure site monomer having~~ a cure site selected from the group consisting of halogen, nitrogen-containing groups, carboxyl, alkoxycarbonyl and combinations thereof.

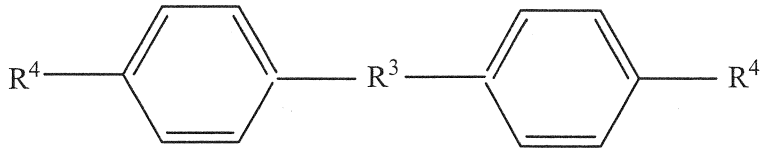
15. The curable fluorine-containing elastomer composition according to claim 1, wherein the at least one curative is selected from the group consisting of fluorinated imidoylamidines; bisaminophenols; bisamidines; bisamidoximes; bisamidrazones; monoamidines; monoamidoximes; monoamidrazones; biasminothiophenols; bisdiaminophenyls; aromatic amines having at least two crosslinkable groups represented by the formula (II):



(II)

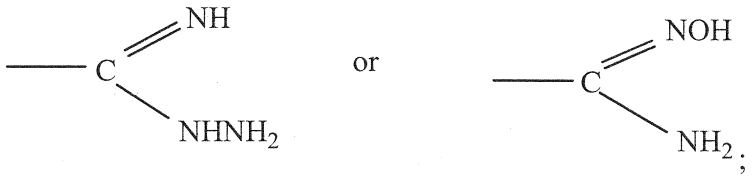
wherein R^1 are the same or different and each is $-NH_2$, $-NHR^2$, -OH or -SH; and R^2 is a monovalent organic group;

compounds represented by the formula (III):

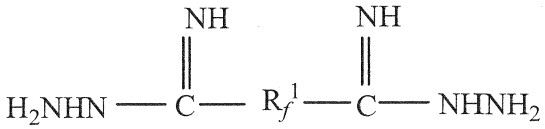


(III)

wherein R^3 is $-SO_2-$, -O-, -CO-, an alkylene group having 1 to 6 carbon atoms, a perfluoroalkylene group having 1 to 10 carbon atoms or a single bond and R^4 is

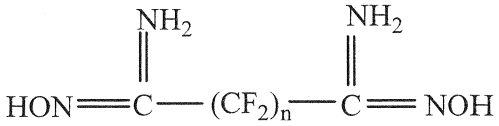


compounds represented by Formula (IV):



(IV)

wherein R_f^1 is a perfluoroalkylene group having 1 to 10 carbon atoms; and compounds represented by the formula (V):



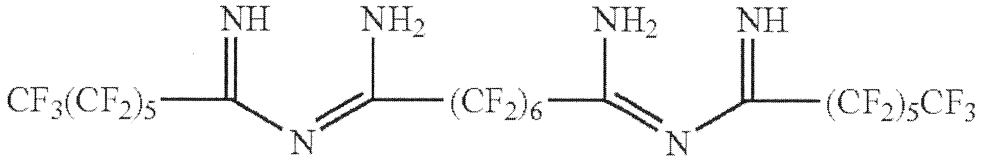
(V)

in which n is an integer of 1 to 10; and combinations thereof, wherein the at least curative is capable of reacting with the least one cure site in the at least one first perfluoropolymer and the at least one cure site in the second perfluoropolymer to crosslink the at least one perfluoropolymer and the at least one second perfluoropolymer in the composition.

16. The curable fluorine-containing elastomer composition according to claim 15, wherein the at least one curative is selected from the group consisting of aromatic amines having at least

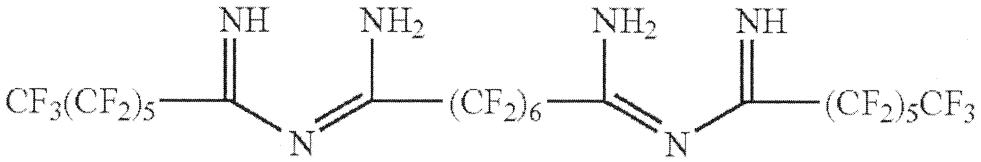
19. The curable fluorine-containing elastomer composition according to claim 18, wherein the at least one curative further comprises bisaminophenol or bisaminophenol AF.

20. The curable fluorine-containing elastomer composition according to claim 18, wherein the elastomer composition is a perfluoroelastomer composition and the at least one curative further comprises



(XII).

21. The curable fluorine containing elastomer composition according to claim 1, wherein the elastomer composition is a perfluoroelastomer composition and the at least one curative comprises



(XII).

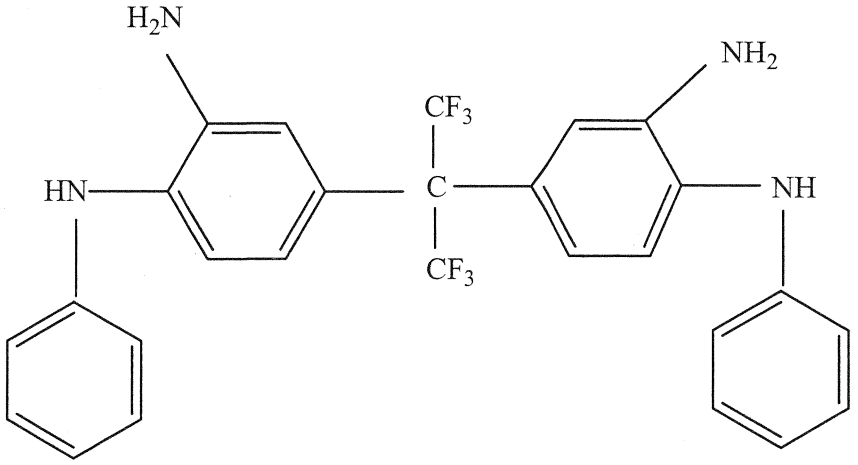
22. The curable fluorine-containing elastomer composition according to claim 1, wherein the cure site monomer in the first curable perfluoropolymer and/or the second curable perfluoropolymer is $CF_2=CFO(CF_2)_5CN$.

23. A curable perfluoroelastomer composition ~~comprising~~ formed by combining

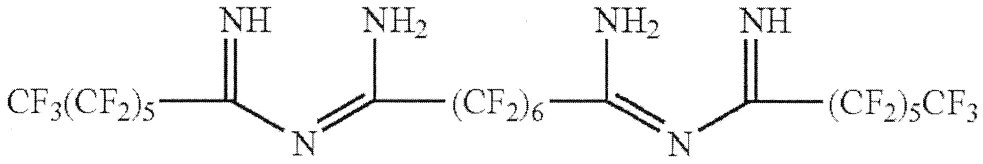
a first curable perfluoropolymer comprising tetrafluoroethylene, a first perfluoroalkylvinyl ether and at least one first cure site monomer having at least one cure site, wherein the tetrafluoroethylene is present in the first curable perfluoropolymer in an amount of at least about 50 mole percent;

a second curable perfluoropolymer comprising tetrafluoroethylene, a second perfluoroalkylvinyl ether and at least one second cure site monomer having at least one cure site, wherein the second curable perfluoropolymer comprises fluoroplastic particles ~~therein~~in a matrix of the second curable perfluoropolymer, wherein such fluoroplastic has a functional curesite and is incorporated into the second curable perfluoropolymer matrix; and

at least one curative the at least one curative is selected from the group consisting of:



(XI),



(XII),

bisaminophenol, bisaminophenol AF, and combinations thereof, wherein at least one of the cure site monomer in the first curable perfluoropolymer and the cure site monomer in the second curable perfluoropolymer is CF_2=CFO(CF_2)$_5$CN, and wherein the second curable ~~fluoropolymer~~ perfluoropolymer comprises fluoroplastic particles in the second curable perfluoropolymer matrix as a result of blending during latex polymerization, and wherein the functional cure site of the fluoroplastic particles is a cyano group and the second perfluoropolymer ~~comprising~~ comprises a nitrogen-containing cure site monomer.

24. The curable perfluoroelastomer composition according to claim 23, wherein the tetrafluoroethylene is present in the first curable perfluoropolymer in an amount of at least about 60 mole percent.

25. The curable perfluoroelastomer composition according to claim 24, wherein the tetrafluoroethylene is present in the first curable perfluoropolymer in an amount of at least about 70 mole percent.

26. The curable perfluoroelastomer composition according to claim 23, wherein the tetrafluoroethylene is present in the first curable perfluoropolymer in an amount of about 60 mole percent to about 95 mole percent.

27. A cured fluorine-containing elastomer formed by curing a curable fluorine-containing composition ~~comprising a blend of~~ which is formed by combining

a first curable perfluoropolymer comprising tetrafluoroethylene, a first perfluoroalkylvinyl ether and at least one first cure site monomer having at least one cure site,

wherein tetrafluoroethylene is present in the first curable perfluoropolymer in an amount of at least about 50 mole percent;

a second curable perfluoropolymer comprising tetrafluoroethylene, a second perfluoroalkylvinyl ether and at least one second cure site monomer having at least one cure site, wherein the second curable perfluoropolymer comprises fluoroplastic particles ~~therein~~ in a matrix of the second curable perfluoropolymer, wherein such fluoroplastic has a functional curesite and is incorporated into the second curable perfluoropolymer matrix; and

at least one curative, wherein the fluoroplastic having the curesite and incorporated into the second curable perfluoropolymer matrix remains in the matrix of the cured perfluoroelastomer after combining and curing the first and the second curable perfluoropolymers.

28. A molded article formed by heat curing and shaping a composition ~~comprising a blend of~~formed by combining

a first curable perfluoropolymer comprising tetrafluoroethylene, a first perfluoroalkylvinyl ether and at least one first cure site monomer having at least one cure site, wherein tetrafluoroethylene is present in the first curable perfluoropolymer in an amount of at least about 50 mole percent;

a second curable perfluoropolymer comprising tetrafluoroethylene, a second perfluoroalkylvinyl ether and at least one second cure site monomer having at least one cure site, wherein the second curable perfluoropolymer comprises fluoroplastic particles ~~therein~~in a matrix of the second curable perfluoropolymer, wherein such fluoroplastic has a functional curesite and is incorporated into the second curable perfluoropolymer matrix; and

at least one curative.