What is claimed is:

1. A thermally crosslinked polymeric composition comprising:

a first polymer comprising a first repeat unit, the first repeat unit comprising a carboxyl group and an imide group,

wherein the first polymer crosslinks to a second polymer formed from a second repeat unit, and wherein the first polymer crosslinks to the second polymer without formation of an ester group, and

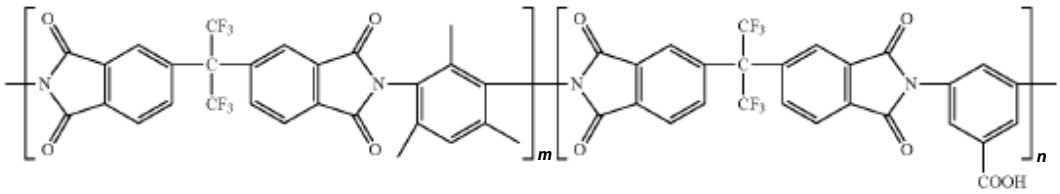
wherein the first polymer crosslinks to the second polymer by thermal decarboxylation of the first repeat unit.

2. The composition of claim 1, wherein the first repeat unit is formed by the reaction of (4,4′-hexafluoroisopropylidene)bisphthalic dianhydride and an amine.

3. The composition of claim 2, wherein the amine comprises 3,5-diaminobenzoic acid.

4. The composition of claim 3 wherein the amine further comprises diaminomesitylene, (4,4′-hexafluoroisopropylidene)dianiline, m-phenylene diamine or combinations thereof.

5. The composition of claim 4, wherein the first repeat unit comprises

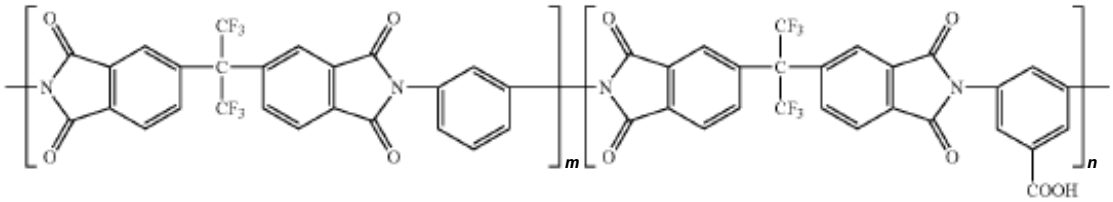


and wherein m is greater than or equal to one and n is greater than or equal to one.

6. The composition of claim 5, wherein the ratio of m, (4,4′-hexafluoroisopropylidene)bisphthalic dianhydride and diaminomesitylene, to n, (4,4′-hexafluoroisopropylidene)bisphthalic dianhydride and 3,5-diaminobenzoic acid, is greater than or equal to 1:1.

7. The composition of claim 1, wherein the first polymer comprises an aromatic backbone polymer.

8. The composition of claim 4, wherein the first repeat unit comprises



and wherein m is greater than or equal to one and n is greater than or equal to one.

9. A method of making a thermally crosslinked polymer, comprising:

providing a polymer mixture, the mixture comprising

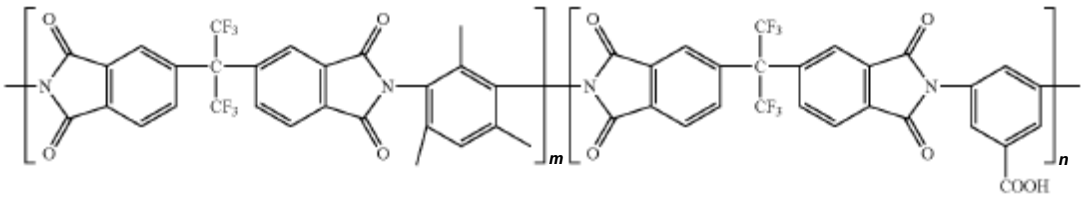
a first polymer comprising a first repeat unit, wherein the first repeat unit comprises a carboxyl group and an imide group, and

a second polymer comprising a second repeat unit;

heating the polymer mixture to a temperature sufficient to thermally crosslink the polymers; and

crosslinking the polymers to form a thermally crosslinked polymer, wherein crosslinking the polymers does not include the formation of an ester group and crosslinks by decarboxylation.

10. The method of claim 9, wherein the first repeat unit comprises



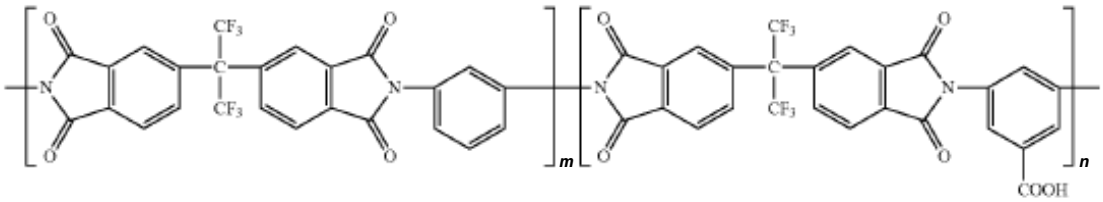
and wherein m is greater than or equal to one and n is greater than or equal to one.

11. The method of claim 10, wherein the heating the polymer mixture to a temperature sufficient to crosslink the polymers comprises heating the polymer mixture to at least about 389° C. for about 40 minutes.

12. The method of claim 9, wherein the heating the polymer mixture to a temperature sufficient to crosslink the polymers comprises heating the polymer mixture to at least about 15° C. below the glass transition temperature of the first polymer but no higher than about 15° C. above the glass transition temperature of the first polymer.

13. The method of claim 9, further comprising quenching the crosslinked polymer to about room temperature.

14. The method of claim 9, wherein the first repeat unit comprises



and wherein m is greater than or equal to one and n is greater than or equal to one.