

Claims:

1. A dielectric film-forming composition, comprising:
 - a) at least one cyclized polydiene resin having a substituted or unsubstituted
5 alkenyl group;
 - b) at least one reactive functional compound having at least two functional groups capable of reacting with the substituted or unsubstituted alkenyl group on cyclized polydiene resin; and
 - c) at least one catalyst capable of inducing reaction of the cyclized polydiene
10 resin with the reactive functional compound.
2. The composition of claim 1, wherein the at least one cyclized polydiene resin comprises a cyclized polyisoprene, a cyclized polybutadiene, a cyclized
15 polypentadiene, or a copolymer thereof.
3. The composition of claim 1, wherein the at least one cyclized polydiene resin has a weight average molecular weight (Mw) of from at least about 5,000 Daltons to at most about 500,000 Daltons.
- 20 4. The composition of claim 1, wherein the at least one cyclized polydiene resin is a mixture of:
 - a) a cyclized polydiene resin with a weight average molecular weight of from about 5,000 Daltons to about 20,000 Daltons;
 - b) a cyclized polydiene resin with a weight average molecular weight of from
25 about 25,000 Daltons to about 60,000 Daltons; and
 - c) a cyclized polydiene resin with a weight average molecular weight of from about 70,000 Daltons to about 200,000 Daltons.
5. The composition of claim 1, wherein the at least one cyclized polydiene
30 resin is in an amount of from about 2 wt% to about 40 wt% of the composition.

6. The composition of claim 1, wherein the dielectric film-forming composition is capable of forming a dielectric film having a T_g of at least about 120°C.

7. The composition of claim 1, wherein the at least one of the reactive functional compound comprises a compound containing at least two functional groups selected from the groups consisting of a (meth)acrylate group, an olefin group, a cycloolefin group, an alkynyl group, and a combination thereof.

8. The composition of claim 1, wherein the at least one reactive functional compound is in an amount of from about 1 wt% to about 25 wt% of the composition.

9. The composition of claim 1, wherein the at least one catalyst is in an amount of from about 0.2 wt% to about 3 wt% of the composition.

10. A process of preparing a dielectric film, comprising:
a) coating the dielectric film-forming composition of claim 1 on a substrate to form a film;
b) optionally baking the film at a temperature from about 50°C to about 150°C for about 20 seconds to about 240 seconds; and
c) exposing the film to radiation, heat, or a combination thereof without a mask.

11. A process for preparing a dry film, comprising:
a) coating a carrier substrate with a dielectric film-forming composition of claim 1;
b) drying the coated dielectric film-forming composition to form a dry film; and
c) optionally, applying a protective layer to the dry film.

12. A dry film prepared by the process of claim 11.

13. A process for depositing a conducting metal layer, comprising:
a) depositing the composition of claim 1 on a substrate to form a dielectric film;

- b) exposing the dielectric film to radiation or heat or a combination of radiation and heat;
- c) patterning the dielectric film to form a patterned dielectric film having openings;
- d) optionally depositing a seed layer on the patterned dielectric film;
- 5 e) depositing a conducting metal layer in at least one opening in the patterned dielectric film; and
- f) optionally repeating steps a) to e) at least one time.

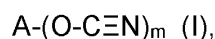
14. A process for forming a dielectric film on a substrate, comprising steps of:
- 10 a) providing a substrate containing conducting metal wire structures that form a network of lines and interconnects on the substrate;
- b) depositing the composition of claim 1 on the substrate to form a dielectric film;
- c) exposing the dielectric film to radiation or heat or a combination of radiation and heat; and
- 15 d) optionally, repeating steps a) to c) at least one time.

15. A three dimensional object formed by the process of claim 14.

16. The object of claim 15, comprising the dielectric film in at least two stacks.
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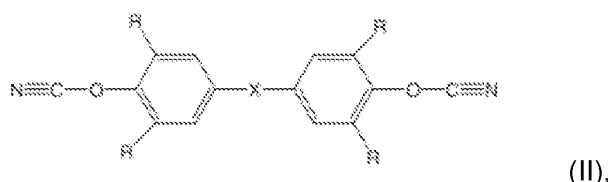
17. A dielectric film-forming composition, comprising:
- a) at least one cyclized polydiene resin; and
- b) at least one cyanate ester compound, the at least one cyanate ester compound comprising at least two cyanate groups.
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18. The composition of claim 17, wherein the at least one cyanate ester compound has Structure (I):

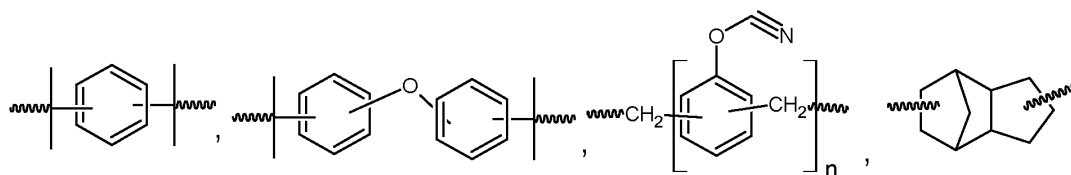


- wherein m is an integer of at least 2 and A is a divalent organic group comprising a substituted or unsubstituted aromatic group.
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19. The composition of claim 18, wherein the at least one cyanate ester compound has Structure (II):

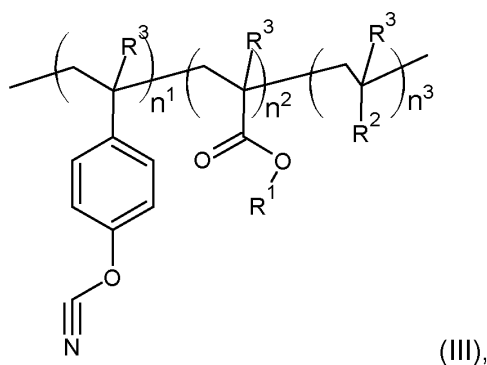


wherein R is a hydrogen atom, a C₁-C₃ alkyl group, a fully or partially halogen substituted C₁-C₃ alkyl group, or a halogen atom; and X is a single bond, -O-, -S-,
 5 -(C=O)-, -(C=O)-O-, -O-(C=O)-, -(S=O)-, -(SO₂)-, -CH₂CH₂-O-, a substituted or unsubstituted C₁-C₁₀ alkylene, a fully or partially fluoro substituted C₁-C₄ alkylene, a substituted or unsubstituted C₃-C₁₀ cycloalkylene, or one of the following groups:



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20. The composition of claim 17, wherein the at least one cyanate ester compound has Structure (II):



wherein n₁ is an integer of at least 2, n₂ and n₃ are independently 0 or an integer from 1
 15 to 100, R¹ is a C₁-C₁₀ alkyl or C₁-C₂₀ arylalkyl group, R² is a substituted or unsubstituted C₁-C₁₀ alkyl, a substituted or unsubstituted C₃-C₁₀ cycloalkyl, a substituted or unsubstituted aryl group, or a -(C=O)-OR⁴ group, in which R⁴ is a non-acid sensitive

substituted alkyl or arylalkyl group; and R³ is a substituted or unsubstituted C₁-C₁₀ alkyl, or a fluoro substituted C₁-C₄ alkyl.

21. The composition of claim 17, wherein the at least one cyanate ester compound is in an amount of from about 1 wt% to about 25 wt% of the composition.

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22. A dielectric film-forming composition, comprising:

a) at least one cyclized polydiene resin having a substituted or unsubstituted alkenyl group;

10 b) at least one reactive functional compound having at least two functional groups capable of reacting with the substituted or unsubstituted alkenyl group on the cyclized polydiene resin;

c) at least one cyanate ester compound, the at least one cyanate ester compound comprising at least two cyanate groups;

15 d) at least one catalyst capable of inducing reaction of the cyclized polydiene resin with the reactive functional compound; and

e) optionally, at least one solvent.