group, a vinylidene group of the formula $CH_2=C(Y^1)–$, and a vinylene group of the formula $Y^1CH=CH–$; and

Y^1 at each occurrence independently is a C_1 to C_{30} hydrocarbyl group.

[0005] The present disclosure further relates to a curable composition comprising (A) a polyolefin component and (B) a curing component comprising a cross-linking agent, wherein the polyolefin component comprises an unsaturated polyolefin of the formula A^1L^1 and a telechelic polyolefin of the formula $A^1L^1L^2A^2$, wherein:

L^1 at each occurrence independently is a polyolefin;

A^1 at each occurrence independently is selected from the group consisting of a vinyl group, a vinylidene group of the formula $CH_2=C(Y^1)–$, a vinylene group of the formula $Y^1CH=CH–$, a mixture of a vinyl group and a vinylene group of the formula $Y^1CH=CH–$, a mixture of a vinyl group and a vinylidene group of the formula $CH_2=C(Y^1)–$, a mixture of a vinylidene group of the formula $CH_2=C(Y^1)–$ and a vinylene group of the formula $Y^1CH=CH–$, and a mixture of a vinyl group, a vinylidene group of the formula $CH_2=C(Y^1)–$, and a vinylene group of the formula $Y^1CH=CH–$;

Y^1 at each occurrence independently is a C_1 to C_{30} hydrocarbyl group;

L^2 is a C_1 to C_{32} hydrocarbylene group; and

A^2 is a hydrocarbyl group comprising a hindered double bond.

[0005a] In one aspect, the present disclosure refers to a curable composition comprising (A) a polyolefin component and (B) a curing component comprising a cross-linking agent, wherein the (A) polyolefin component comprises an unsaturated polyolefin of the formula A^1L^1, and wherein:

L^1 is a polyolefin;

A^1 is selected from the group consisting of a vinyl group, a vinylidene group of the formula $CH_2=C(Y^1)–$, a vinylene group of the formula $Y^1CH=CH–$, a mixture of a vinyl group and a vinylene group of the formula $Y^1CH=CH–$, a mixture of a vinyl group and a vinylidene group of the formula $CH_2=C(Y^1)–$, a mixture of a vinylidene group of the formula $CH_2=C(Y^1)–$ and a vinylene group of the formula $Y^1CH=CH–$, and a mixture of a vinyl group, a vinylidene group of the formula $CH_2=C(Y^1)–$, and a vinylene group of the formula $Y^1CH=CH–$; and

Y^1 at each occurrence independently is a C_1 to C_{30} hydrocarbyl group,

wherein the (A) polyolefin component further comprises a telechelic polyolefin of the formula $A^1L^1L^2A^2$, wherein:

L^2 is a C_1 to C_{32} hydrocarbylene group; and

A^2 is a hydrocarbyl group comprising a hindered double bond.

[0006] The curable compositions of the present disclosure may further comprise (C) an additive component.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIGS. 1A and 1B provide the 1H NMR and GC/MS spectra for the synthesis of CTA 1, respectively.

[0008] FIG. 2 provides the 1H NMR spectrum for the synthesis of CTA 2.

[0009] FIG. 3 provides the 1H NMR spectrum for the synthesis of a telechelic polyolefin using CTA 7.

[0010] FIG. 4 provides the 1H NMR spectrum for the synthesis of a telechelic polyolefin using CTA 8.

[0011] FIG. 5 provides a torque vs. time curve for certain examples.

[0012] FIG. 6 provides a torque vs. time curve for certain examples.

[0013] FIG. 7 provides a MH-ML vs. unsaturations/1000C curve for certain examples.

[0014] FIG. 8 provides a MH-ML vs. unsaturations/1000C curve for certain examples.

What is claimed is:

1. A curable composition comprising (A) a polyolefin component and (B) a curing component comprising a cross-linking agent, wherein the (A) polyolefin component comprises an unsaturated polyolefin of the formula A^1L^1, and wherein:

L^1 is a polyolefin;

A^1 is selected from the group consisting of a vinyl group, a vinylidene group of the formula $CH_2=C(Y^1)–$, a vinylene group of the formula $Y^1CH=CH–$, a mixture of a vinyl group and a vinylene group of the formula $Y^1CH=CH–$, a mixture of a vinyl group and a vinylidene group of the formula $CH_2=C(Y^1)–$, a mixture of a vinylidene group of the formula $CH_2=C(Y^1)–$ and a vinylene group of the formula $Y^1CH=CH–$, and a mixture of a vinyl group, a vinylidene group of the formula $CH_2=C(Y^1)–$, and a vinylene group of the formula $Y^1CH=CH–$; and

Y^1 at each occurrence independently is a C_1 to C_{30} hydrocarbyl group,

wherein the (A) polyolefin component further comprises a telechelic polyolefin of the formula $A^1L^1L^2A^2$, wherein:

L^2 is a C_1 to C_{32} hydrocarbylene group; and

A^2 is a hydrocarbyl group comprising a hindered double bond.

2. The composition of claim 1, wherein the formulation comprises from 80 wt% to 99.99 wt% of the (A) polyolefin component and from 0.01 wt% to 20 wt% of the (B) curing component comprising the cross-linking agent.

3. The composition of claim 1 or 2, wherein L^1 is an ethylene/alpha-olefin copolymer comprising units derived from ethylene and a C_3 to C_{30} alpha-olefin.

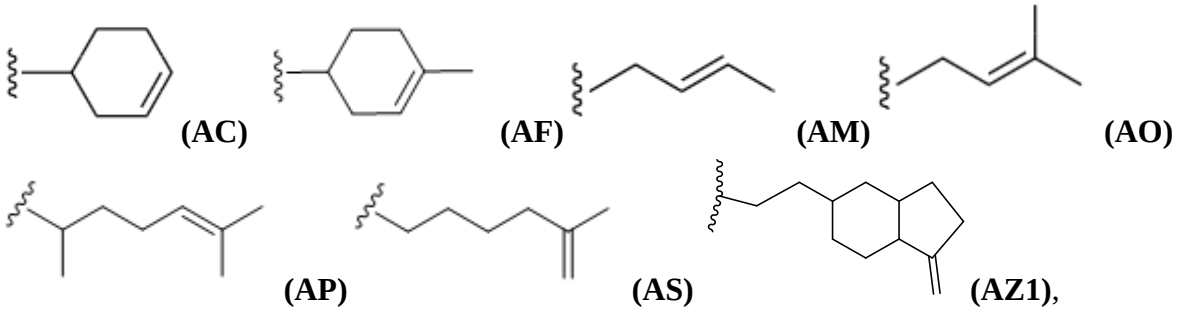
4. The composition of any of the preceding claims, wherein the C_3 to C_{30} alpha-olefin is selected from the group consisting of propylene, 1-butene, 1-hexene, and 1-octene.

5. The composition of any of the preceding claims, wherein the hindered double bond is selected from the group consisting of the double bond of a vinylidene group, the double bond of a vinylene group, the double bond of a trisubstituted alkene, and the double bond of a vinyl group attached to a branched alpha carbon.

6. The composition of any of the preceding claims, wherein A^2 a C_3 to C_{30} cyclic hydrocarbyl group or a C_3 to C_{30} acyclic hydrocarbyl group.

7. The composition of any of the preceding claims, wherein A^2 is selected from the group consisting of an unsubstituted cycloalkene, an alkyl-substituted cycloalkene, and an acyclic alkyl group.

8. The composition of any of the preceding claims, wherein A^2 is selected from the group consisting of:



(AC) **(AF)** **(AM)** **(AO)**

(AP) **(AS)** **(AZ1)**,

wherein the endocyclic double bond in (AC) and (AF) may be between any two adjacent carbon atoms that are ring members, and wherein the pendant methyl group of (AF) may be connected to any carbon atom that is a ring member.

9. The composition of any of the preceding claims, wherein each of the unsaturated polyolefin of the formula A^1L^1 and the telechelic polyolefin of the formula $A^1L^1L^2A^2$ in the (A) polyolefin component comprises a weight average molecular weight (Mw) range from 1,000 to 1,000,000 g/mol.

10. The curable composition of any of preceding claims, wherein L^1 of the unsaturated polyolefin of the formula A^1L^1 is covalently bonded to A^1 through a carbon-carbon single bond.

11. The curable composition of any of the preceding claims , wherein L^1 of the telechelic polyolefin of the formula $A^1L^1L^2A^2$ is covalently bonded to each of A^1 and L^2 through carbon-carbon single bonds, and wherein L^2 of the telechelic polyolefin of the formula $A^1L^1L^2A^2$ is covalently bonded to A^2 through a carbon-carbon single bond.

12. The composition of any of the preceding claims, wherein the (b) curing component further comprises a co-agent.

13. The composition of any of the preceding claims further comprising from 0 to 10 wt% of (C) an additive component.

14. The composition of any of the preceding claims, wherein the (C) additive component comprises zinc oxide and/or stearic acid.