$Y^1CH=CH–$, 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.

[0005] The (C) additive component may further comprise a blowing agent activator and a filler.

[0005a] In one aspect, there is provided a curable composition for a crosslinked foam, the curable composition comprising (A) a polyolefin component comprising a telechelic polyolefin of the formula $A^1L^1L^2A^2$; (B) a curing component comprising a cross-linking agent; and (C) an additive component comprising a blowing agent, 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 $Y^1CH=CH–$;

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.

[0005b] In another aspect, there is provided a curable composition for a crosslinked foam, the curable composition comprising (A) a polyolefin component comprising an unsaturated polyolefin of the formula A^1L^1 and a telechelic polyolefin of the formula $A^1L^1L^2A^2$; (B) a curing component comprising a cross-linking agent; and (C) an additive component comprising a blowing agent, 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.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIGS. 1A and 1B provide the 1H NMR and GC/MS spectra for the synthesis of CTA 1, respectively.

[0007] FIG. 2 provides the 1H NMR spectrum for the synthesis of CTA 2.

[0008] FIG. 3 provides the 1H NMR spectrum for the synthesis of a telechelic polyolefin using CTA 7.

[0009] FIG. 4 provides the 1H NMR spectrum for the synthesis of a telechelic polyolefin using CTA 8.

DETAILED DESCRIPTION

Definitions

[0010] All references to the Periodic Table of the Elements herein shall refer to the Periodic Table of the Elements, published and copyrighted by CRC Press, Inc., 2003. Also, any references to a Group or Groups shall be to the Group or Groups reflected in this Periodic Table of the Elements using the IUPAC system for numbering groups. Unless stated to the contrary, implicit from the context, or customary in the art, all parts and percents are based on weight. For purposes of United States patent practice, the contents of any patent, patent application, or publication referenced herein are hereby incorporated by reference in their entirety (or the equivalent US version thereof is so incorporated by reference) especially with respect to the disclosure of synthetic techniques, definitions (to the extent not inconsistent with any definitions provided herein) and general knowledge in the art.

[0011] The numerical ranges disclosed herein include all values from, and including, the lower and upper value. For ranges containing explicit values (e.g., 1, or 2, or 3 to 5, or 6, or 7), any subrange between any two explicit values is included (e.g., 1 to 2; 2 to 6; 5 to 7; 3 to 7; 5 to 6; etc.). The numerical ranges disclosed herein further include the fractions between any two explicit values.

What is claimed is:

~~1. A curable composition for a crosslinked foam, the curable composition comprising (A) a polyolefin component comprising an unsaturated polyolefin of the formula A^1L^1; (B) a curing component comprising a cross-linking agent; and (C) an additive component comprising a blowing agent, 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.~~

~~2.~~1. A curable composition for a crosslinked foam, the curable composition comprising (A) a polyolefin component comprising a telechelic polyolefin of the formula $A^1L^1L^2A^2$; (B) a curing component comprising a cross-linking agent; and (C) an additive component comprising a blowing agent, 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 $Y^1CH=CH$–;

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.

~~3.~~2. A curable composition for a crosslinked foam, the curable composition comprising (A) a polyolefin component comprising an unsaturated polyolefin of the formula A^1L^1 and a telechelic

polyolefin of the formula $A^1L^1L^2A^2$; (B) a curing component comprising a cross-linking agent; and (C) an additive component comprising a blowing agent, 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.

~~4.~~3. The curable composition of claim ~~2~~ 1 or ~~3~~2, wherein the telechelic polyolefin has a weight average molecular weight from 1,000 g/mol to 1,000,000 g/mol.

~~5.~~4. The curable composition of claim 1 or ~~3~~2, wherein the unsaturated polyolefin has a weight average molecular weight from 1,000 g/mol to 1,000,000 g/mol.

~~6.~~5. The curable composition of any of the previous claims, wherein the (A) polyolefin component further comprises an ethylene-based polymer.

~~7.~~6. The curable composition of claim ~~6~~5, wherein the ethylene-based polymer is an ethylene/alpha-olefin copolymer or an olefin block copolymer.

~~8.~~7. The curable composition of any of the previous claims, wherein the (B) curing component comprising the crosslinking agent is present in an amount of from 0.1 wt% to 2 wt%, based on the total weight of the curable composition.

~~9.~~8. The curable composition of any of the previous claims, wherein the curable composition has an MH-ML of greater than or equal to 2.9 dNm after curing at 180°C for 15 minutes.

~~10.~~9. The curable composition of any of claims 1 and ~~3~~2-~~9~~8, 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.~~10. The curable composition of any of claims ~~2~~1-~~10~~9, 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.~~11. An article made from the curable composition of any of the previous claims.

~~13.~~12. The article of claim ~~12~~11, the article is a crosslinked foam.

~~14.~~13. The article of claim ~~13~~12, wherein the crosslinked foam has an expansion ratio from 130% to 170%.

~~15.~~14. The article of claim ~~14~~13, wherein the article has, in accordance with ASTM D624, a Type C tear of greater than or equal to 8.5 N/mm.