ORGANOMETALLIC CHAIN TRANSFER AGENTS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims the benefit of priority to U.S. provisional application no. 62/786,110, filed on December 28, 2018, which is incorporated herein by reference in its entirety.

FIELD

[0002] Embodiments relate to organometallic compositions that are useful for chain transfer during olefin polymerization.

BACKGROUND

[0003] Polyolefins are one of the most important and widely used polymeric materials in the world. Certain polyolefins are prepared by polymerization of unsaturated monomers via use of an active catalyst in combination with a chain transfer agent. While simple chain transfer agents such as diethyl zinc are known, more complex chain transfer agents can lead to preparation of novel polyolefins, such as novel telechelic polyolefins. This disclosure relates to a novel chain transfer agent that is useful for preparation of such novel polyolefins.

SUMMARY

[0004] The present disclosure relates to a chain transfer agent comprising an organoaluminum compound of the formula $Al(CH_2CH(Y^2)A^2)_3$ and an organozinc compound of the formula $Zn(CH_2CH(Y^2)A^2)_2$, wherein:

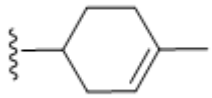
Y^2 at each occurrence independently is hydrogen or a C_1 to C_{30} hydrocarbyl group; and

A^2 at each occurrence independently is a hydrocarbyl group comprising a hindered double bond.

[0004a] In one aspect, the present disclosure relates to an organometallic composition comprising an organoaluminum compound of the formula $Al(CH_2CH(Y^2)A^2)_3$ and an organozinc compound of the formula $Zn(CH_2CH(Y^2)A^2)_2$, wherein:

Y^2 at each occurrence independently is hydrogen or a C_1 to C_{30} hydrocarbyl group; and

A^2 at each occurrence independently is a hydrocarbyl group comprising a hindered double bond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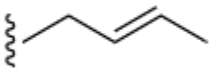
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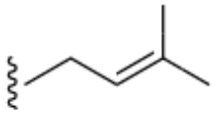
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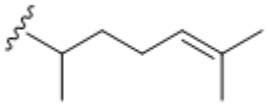
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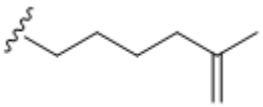
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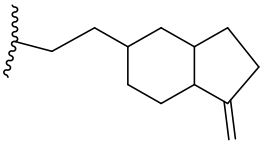

(AZ1),

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.

[0005] The present disclosure further relates to processes for preparing the chain transfer agent comprising an organoaluminum compound of the formula $Al(CH_2CH(Y^2)A^2)_3$ and an organozinc compound of the formula $Zn(CH_2CH(Y^2)A^2)_2$.

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.

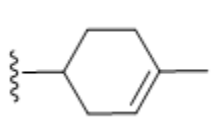
[0008] FIG. 3 provides the 1H NMR spectrum for the synthesis of CTA 6.

What is claimed is:

1. An organometallic composition comprising an organoaluminum compound of the formula $Al(CH_2CH(Y^2)A^2)_3$ and an organozinc compound of the formula $Zn(CH_2CH(Y^2)A^2)_2$, wherein:

Y^2 at each occurrence independently is hydrogen or a C_1 to C_{30} hydrocarbyl group; and

A^2 at each occurrence independently is a hydrocarbyl group comprising a hindered double bond



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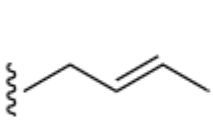

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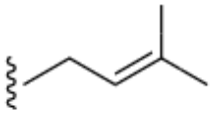

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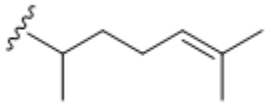

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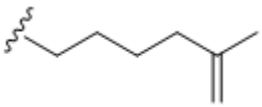

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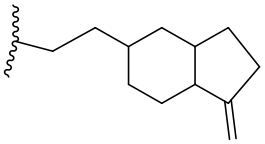

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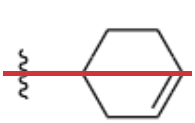
wherein the endocyclic double bond in (AC) and (AF) may be between any two adjacent carbon atoms that are ring members, and wherein the pendant methyl group of (AF) may be connected to any carbon atom that is a ring member.

~~2. The composition of claim 1, 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.~~

~~3. 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.~~

~~4. 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.~~

~~5. The composition of any of the preceding claims, wherein A^2 is selected from the group consisting of:~~



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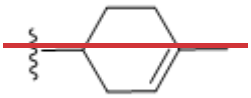

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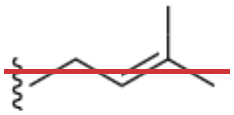

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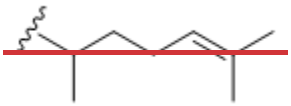

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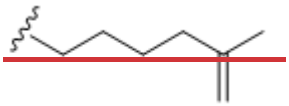

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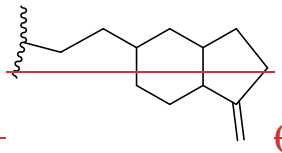

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