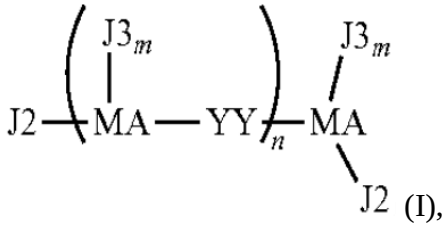
What is claimed is:

1. A composition having the formula (I):



(I),

wherein:

each MA independently is Al, B, Ga, Zn, or Mg;

when MA is Al, B, or Ga, then m is 1;

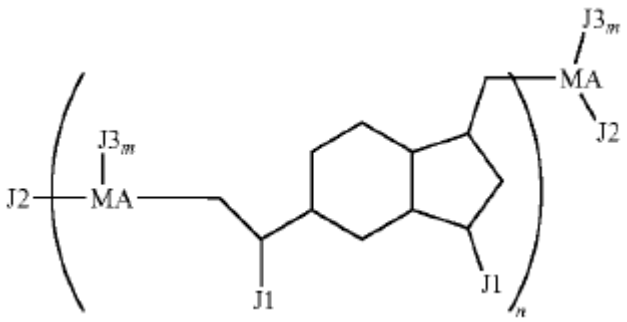
when MA is Zn or Mg, then m is 0;

n is a number from 1 to 100;

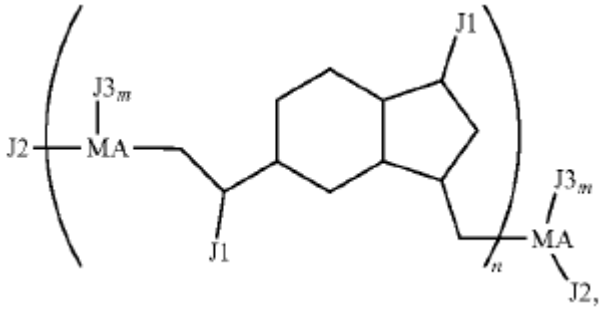
YY is a derivative of a linking group, wherein the linking group is a C_{4-100} hydrocarbon comprising at least two vinyl groups and optionally includes at least one heteroatom; and

each J2 and J3 is a derivative of a strained olefin.

2. The composition of claim 1 having the following structural formulae:

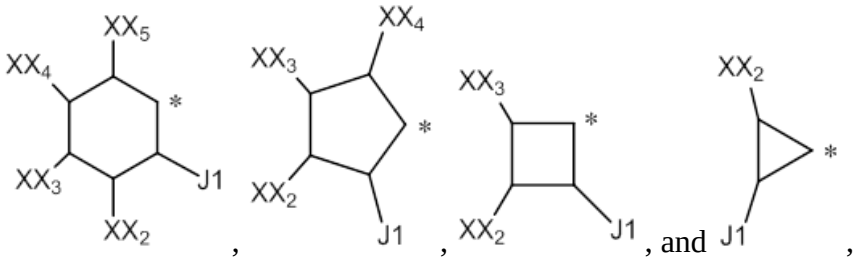


or



wherein J1 is hydrogen or a $C_{1\text{-}20}$ alkyl group.

3. The composition of claim 1 or claim 2, wherein each J2 and J3 is selected from the group consisting of the following structural formulae:



, , , and ,

wherein:

J1 is hydrogen or a $C_{1\text{-}20}$ alkyl group; and

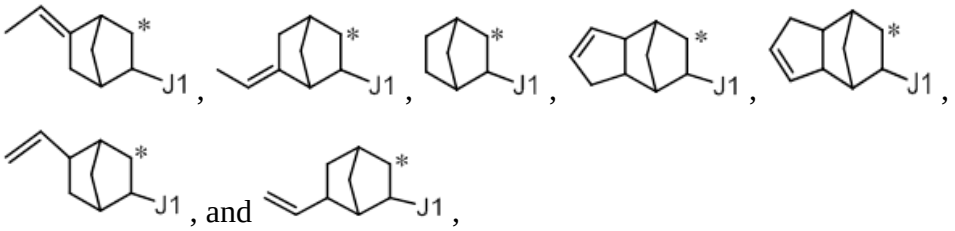
each XX2, XX3, XX4, and XX5 is hydrogen, a substituted or unsubstituted $C_{1\text{-}20}$ alkyl group, or a substituted or unsubstituted $C_{6\text{-}20}$ aryl group,

wherein XX2, XX3, XX4, and XX5 may be the same or different,

wherein each XX2, XX3, XX4, and XX5 optionally includes at least one heteroatom, and

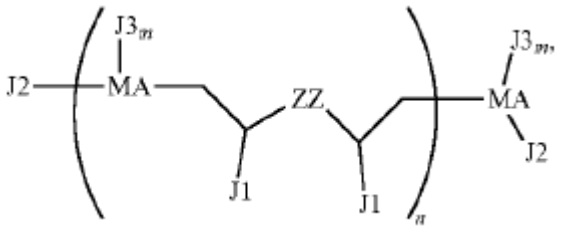
wherein two of XX2, XX3, XX4, and XX5 may optionally form cyclic structures.

4. The composition of any of claims 1 to 3, wherein each J2 and J3 is selected from the group consisting of the following structural formulae:



wherein J1 is hydrogen or a C_{1-20} alkyl group.

5. The composition of claim 1 having the following structural formula:



,

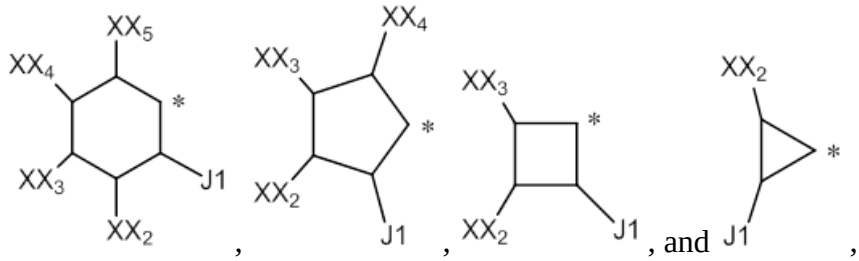
wherein:

J1 is hydrogen or a C_{1-20} alkyl group; and

ZZ is a linear or branched C_{4-100} hydrocarbyl group that optionally includes at least one heteroatom, and wherein ZZ may be aliphatic or aromatic.

6. The composition of claim 5, wherein YY is a derivative of an alpha,omega-diene.

7. The composition of claim 5 or claim 6, wherein each J2 and J3 is selected from the group consisting of the following structural formulae:



wherein:

J1 is hydrogen or a C_{1-20} alkyl group; and

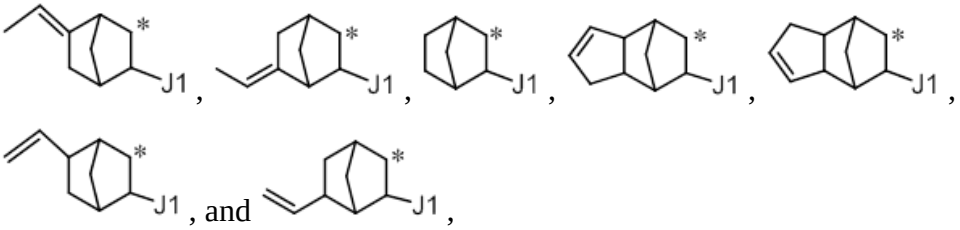
each XX2, XX3, XX4, and XX5 is hydrogen, a substituted or unsubstituted C_{1-20} alkyl group, or a substituted or unsubstituted C_{6-20} aryl group,

wherein XX2, XX3, XX4, and XX5 may be the same or different,

wherein each XX2, XX3, XX4, and XX5 optionally includes at least one heteroatom, and

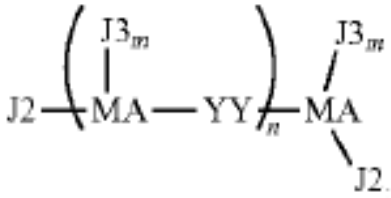
wherein two of XX2, XX3, XX4, and XX5 may optionally form cyclic structures.

8. The composition of any of claims 5 to 7, wherein each J2 and J3 is selected from the group consisting of the following structural formulae:



wherein J1 is hydrogen or a C_{1-20} alkyl group.

9. A process for preparing the composition having the formula (I):



(I),

wherein:

each MA is independently Al, B, Ga, Zn, or Mg;

when MA is Al, B, or Ga, then m is 1;

when MA is Zn or Mg, then m is 0;

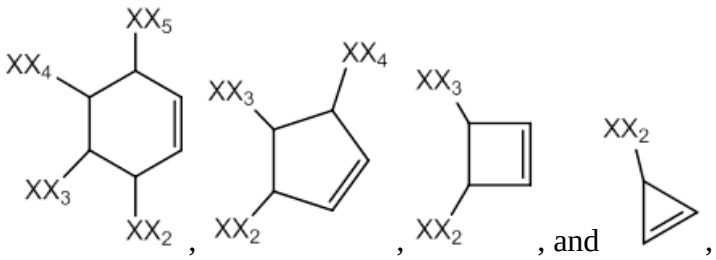
n is a number from 1 to 100;

YY is a derivative of a linking group, wherein the linking group is a C_{4-100} hydrocarbon comprising at least two vinyl groups and optionally includes at least one heteroatom; and

each J2 and J3 is a derivative of a strained olefin, the process comprising:

(a) combining a linking group, an organometallic compound, a co-catalyst, a solvent, a first catalyst precursor, and a strained olefin, and (b) obtaining a final solution comprising the composition having the formula (I), wherein the linking group is a C_{4-100} hydrocarbon comprising at least two vinyl groups and optionally includes at least one heteroatom.

10. The process of claim 9, wherein the linking group is 1,2,4-trivinylcyclohexane and the strained olefin is selected from the group consisting of the following structural formulae:



, , , and ,

wherein:

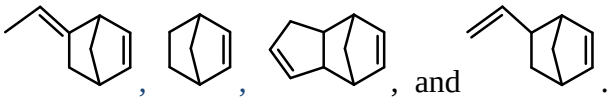
each XX2, XX3, XX4, and XX5 is hydrogen, a substituted or unsubstituted C_{1-20} alkyl group, or a substituted or unsubstituted C_{6-20} aryl group,

wherein XX2, XX3, XX4, and XX5 may be the same or different,

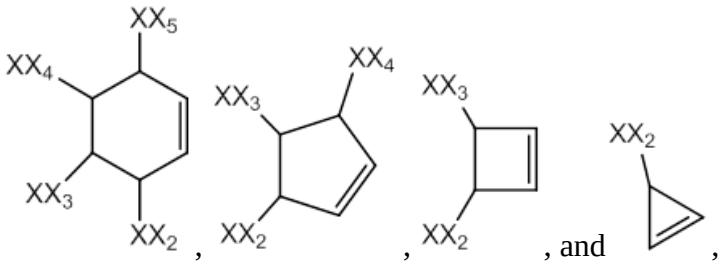
wherein each XX2, XX3, XX4, and XX5 optionally includes at least one heteroatom, and

wherein two of XX2, XX3, XX4, and XX5 may optionally form cyclic structures.

11. The process of claim 9 or claim 10, wherein the strained olefin is selected from the group consisting of the following structural formulae:



12. The process of claim 9, wherein the linking group is an alpha,omega-diene and the strained olefin is selected from the group consisting of:



wherein:

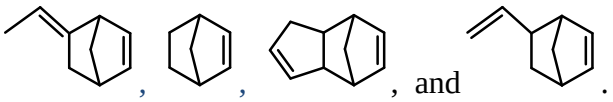
each XX2, XX3, XX4, and XX5 is hydrogen, a substituted or unsubstituted C_{1-20} alkyl group, or a substituted or unsubstituted C_{6-20} aryl group,

wherein XX2, XX3, XX4, and XX5 may be the same or different,

wherein each XX2, XX3, XX4, and XX5 optionally includes at least one heteroatom, and

wherein two of XX2, XX3, XX4, and XX5 may optionally form cyclic structures.

13. The process of claim 12, wherein the strained olefin is selected from the group consisting of:



14. The process of any of claims 9 to 13, wherein the organometallic compound comprises a trivalent metal, a divalent metal, or a mixture of a trivalent metal and a divalent metal.

15. A polymerization process for preparing a polymer composition, the process comprising:

contacting at least one olefin monomer with a catalyst composition; wherein

the catalyst composition comprises the reaction product of a second catalyst precursor, a co-catalyst, and the composition of any of claims 1 to 8.

16. A polymerization process for preparing a polymer composition, the process comprising:

contacting at least one olefin monomer with a catalyst composition; wherein

the catalyst composition comprises the reaction product of a second catalyst precursor, a co-catalyst, and the composition prepared according to the process of any of claims 9 to 14.

17. A polymerization process for preparing a polymer composition, the process comprising:

contacting at least one olefin monomer with a catalyst composition;

wherein the catalyst composition comprises the reaction product of a second catalyst precursor, a co-catalyst, and the composition prepared by the process of any of claims 9 to 14, and

wherein the second catalyst precursor is the same compound as the first catalyst precursor.

18. A polymer composition obtained by the process of claim 15.

19. A catalyst composition comprising the reaction product of at least one catalyst precursor, at least one co-catalyst, and the composition of any of claims 1 to 8.

20. A process for preparing a telechelic functional polymer comprising performing functional group conversion reactions at carbon-metal bonds of the composition of any of claims 1 to 8.