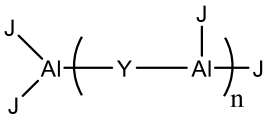
What is claimed is:

1. A composition of formula (I):



(I),

wherein:

n is a number from 1 to 100;

Y is a linking group composed of a linear, branched, or cyclic C_4 to C_{100} hydrocarbylene group that optionally includes at least one heteroatom and that is aliphatic or aromatic, wherein Y comprises two points of attachment to Al atoms and at least one of the two points of attachment is $–CH_2–$;

each J group is independently hydrogen or a substituted or unsubstituted acyclic alkyl group; and

two J groups attached to the same Al atom can be optionally covalently linked together.

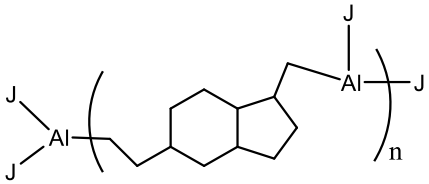
2. The composition of Claim 1, wherein Y has the formula (II):

$-CH_2CH_2(CHR_1)_mCH_2CH_2-$ (II), wherein:

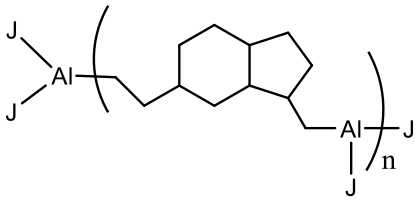
R_1 is hydrogen or a C_1 to C_{20} alkyl or aryl group; and

m is a number from 0 to 20.

3. The composition of Claim 1 having the following formulae:



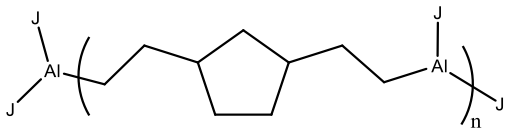
or



,

wherein n is a number from 1 to 100, each J group is independently hydrogen or a substituted or unsubstituted acyclic alkyl group, and two J groups attached to the same Al atom can be optionally covalently linked together.

4. The composition of Claim 1 having the following formula:



wherein n is a number from 1 to 100, each J group is independently hydrogen or a substituted or unsubstituted acyclic alkyl group, and two J groups attached to the same Al atom can be optionally covalently linked together.

5. The composition of any of the preceding claims, wherein each J is hydrogen or a C_1 to C_{20} acyclic alkyl group.

6. The composition of any of the preceding claims, wherein n is a number from 1 to 10.

7. The composition of any of the preceding claims, wherein n is a number from 1 to 3.

8. A process for preparing an organoaluminum composition, the process comprising:

(a) combining an aluminum compound, a linking agent, and an optional solvent at a temperature of from 25 °C to 200 °C, and

(b) obtaining the organoaluminum composition, wherein:

the aluminum compound has the formula $Al(J)_3$, wherein each J group is independently hydrogen or a substituted or unsubstituted acyclic alkyl group, and, optionally, two J groups can be covalently linked together; and the linking agent is a C_4 to C_{100} hydrocarbon comprising either at least two vinyl groups or a vinyl group and a cyclic olefin group and, optionally, includes at least one heteroatom.

9. The process of Claim 8, wherein the linking agent is an alpha,omega-diene.

10. The process of Claim 8, wherein the linking agent is 1,2,4-trivinylcyclohexane or 1,3-divinylcyclopentane.