CLAIMS

1. A composition comprising:

(i) a supported aluminoxane intermediate composition comprising:

a) a support; b) an organoaluminum compound; and c) an oxygen source

(ii) a compound having the formula $R^1(X)_n$; wherein R^1 is a hydrocarbyl group having from about 1 to about 20 carbon atoms; n is from 1 to the number of possible substitutions of the hydrocarbyl group and each X may be substituted anywhere on R^1 and is independently halogen, $-OSi(R^2)_3$, $-N(Si(R^2)_3)_2$, $-N(R^2)_2$, $-SR^2$, $-P(R^2)_2$, -CN, or $-OR^3$; wherein each R^2 is independently hydrogen or a hydrocarbyl group having from about 1 to about 20 carbon atoms; each R^3 is independently a hydrocarbyl having from 1 to 20 carbon atoms, wherein when at least one R^2 is a hydrocarbyl group; R^1 and R^2 or R^1 and R^3 may be linked together to form a cyclic group; provided that at least one X is not directly bonded to an aryl group, and provided that when X is not halogen, X is bonded to a secondary or tertiary carbon, or a $-CH_2$-aryl group; and

(iii) a trihydrocarbylaluminum compound having the formula AlR_3, wherein each R is independently a C_1-C_{20} hydrocarbyl group.

2. The composition of claim 1, wherein R is C_1-C_8 alkyl, R^1 is a C_3-C_8 alkyl or C_7-C_{15} aralkyl, n is 1 to 3, X is halogen or $-OR^2$, and R^2 is a C_1-C_4 alkyl or C_6-C_{15} aralkyl.

3. The composition of claim 1, wherein R^1X is $(R^4)_3C$-OR^5 or $(R^4)_3C$-$N(R^5)_2$; wherein each R^4 is independently a hydrogen or a hydrocarbyl group having from about 1 to about 20 carbon atoms and at least one R^4 is a hydrocarbyl group; R^5 is a hydrocarbyl group having from about 1 to about 20 carbon atoms; or R^4 and R^5 may be linked together to form a cyclic group.

4. The composition of claim 1, wherein $R^1(X)_n$ is: Me_3CF, Me_3SiF, $C_6H_5CH_2F$, $C_6H_5CF_3$, 1,3-$C_6H_4(CF_3)_2$, ^{t}Bu-OMe, 1,2-$(^t$BuO$)_2C_6H_4$; 1,3-$(^t$BuO$)_2C_6H_4$, 1,4-$(^t$BuO$)_2C_6H_4$; ^{t}BuO-CH_2-CH_2- O^{t}Bu; 1-methyl-tetrahydrofuran, 1,2-dimethyl-tetrahydrofuran or mixtures thereof, wherein C_6H_4 is a phenylene group and ^{t}Bu is a tertiary-butyl group.

5. The composition of claim 1, wherein $R^1(X)_n$ is, tertiary-butyl methyl ether, tertiary-butyl ethyl ether, tertiary-butyl propyl ether, tertiary-butyl butyl ether, 1-tert-butoxy-2,6-di-tert-butylbenzene, 1-trimethylsiloxy-2,6-di-tert-butylbenzene, trimethylsiloxybenzene,

trimethylmethoxysilane, benzylmethyl ether, benzyl ethyl ether, benzylpropyl ether, benzyl butyl ether or mixtures thereof.

6. The composition of claim 1, wherein $R^1(X)_n$ is ethylene oxide, propylene oxide, isobutene oxide, 1-butene oxide, styrene oxide, 4-methyl-styrene oxide, 2,2-dimethyl-trimethylene oxide, 2,2-diphenyl-trimethylene oxide, 1-methyl-ethyleneimine, 1,1,2-trimethylethylenimine, 1,1-diphenyl-2-methyl-ethylenimine, 1-methyl-tetrahydro-pyrrole, 1,1,2-trimethyl-tetrahydro-pyrrole, 1,1-diphenyl- 2-methyl-tetrahydro-pyrrole, 1-methyl-piperidine, 1,1,2-trimethyl-piperidine, 1,1-diphenyl-2-methyl-piperidine, or mixtures thereof.

7. The composition of claim 1, wherein the aluminoxane on a support comprises methylaluminoxane, neopentylaluminoxane, benzylaluminoxane, ethylaluminoxane, n-butylaluminoxane, or isobutylaluminoxane.

8. The composition of claim 1, wherein the trihydrocarbylaluminum compound is trimethylaluminum, trineopentylaluminum, tribenzylaluminum, triethylaluminum, tripropylaluminum, tributylaluminum, triisobutylaluminum, tri-n-octylaluminum or mixtures thereof.

9. The composition of claim 1, wherein the support is silica, alumina, silica-alumina, clay, a modified clay composition, or any combination thereof.

10. The composition of claim 1, wherein the mole ratio of the compound of formula $R^1(X)_n$ to the trihydrocarbylaluminum compound is about 0.01:1 to 2:1 and the mole ratio of X in the compound of formula $R^1(X)_n$ to Al in the supported aluminoxane is about 0.01:1 to 0.8:1.

11. The composition of claim 1, further comprising a transition metal component.

12. A method of polymerizing a monomer comprising carrying out such polymerization in the presence of composition of claim 1.

13. A composition comprising:

(i) a trihydrocarbylaluminum compound having the formula AlR_3, wherein each R is independently a C_1-C_{20} alkyl;

(ii) a compound having the formula $R^1(X)_n$; wherein R^1 is a hydrocarbyl group having from about 3 to about 20 carbon atoms; n is from 1 to the number of possible substitutions of the hydrocarbyl group and each X may be substituted anywhere on R^1 and is independently, $-OSi(R^2)_3$, $-N(Si(R^2)_3)_2$, $-N(R^2)_2$; $-SR^2$; $-P(R^2)_2$; -CN, or $-OR^3$; wherein each R^2 is independently hydrogen or a hydrocarbyl group having from about 1 to about 20 carbon atoms; each R^3 is independently a hydrocarbyl having from 1 to 20 carbon atoms, wherein when at least one R^2 is a hydrocarbyl group; R^1 and R^2 or R^1 and R^3 may be linked together to form a cyclic group; provided that at least one X is not directly bonded to an aryl group, and provided that X is bonded to a secondary or tertiary carbon, or a $-CH_2$-aryl group; and

(iii) an aluminoxane.

14. The composition of claim 13, wherein R is C_1-C_8 alkyl, R^1 is a C_3-C_8 alkyl or C_7-C_{15} aralkyl, n is 1 to 3, X is $-OR^2$, and R^2 is a C_1-C_8 alkyl or C_6-C_{15} aralkyl.

15. The composition of claim 13, wherein R^1X is $(R^4)_3C$-OR^5 or $(R^4)_3C$-$N(R^5)_2$; wherein each R^4 is independently a hydrogen or a hydrocarbyl group having from about 1 to about 20 carbon atoms and at least one R^4 is a hydrocarbyl group; R^5 is a hydrocarbyl group having from about 1 to about 20 carbon atoms; or R^4 and R^5 may be linked together to form a cyclic group.

16. The composition of claim 13, wherein $R^1(X)_n$ is ^{t}Bu-OMe, 1,2-(^{t}BuO)$_2$C$_6$H$_4$; 1,3-(^{t}BuO)$_2$C$_6$H$_4$; 1,4-(^{t}BuO)$_2$C$_6$H$_4$; ^{t}BuO-CH_2-CH_2-O^{t}Bu; 1-methyl-tetrahydrofuran, 1,2-dimethyl-tetrahydrofuran or mixtures thereof, wherein C_6H_4 is a phenylene group and ^{t}Bu is a tertiary-butyl group

17. The composition of claim 13, wherein the mole ratio of the compound of formula $R^1(X)_n$ to the trihydrocarbylaluminum compound is about 0.01:1 to 0.1:1 and the mole ratio mole ratio of X in the compound of formula $R^1(X)_n$ to Al in the non-supported solution aluminoxane is about 0.01:1 to 0.8:1.

18. The composition of claim 13, further comprising a carrier.

19. The composition of claim 13, further comprising a transition metal component.

20. A method of polymerizing a monomer comprising carrying out such polymerization in the presence of the composition of claim 13.

21. A polymer formed from the process of claim 12.

22. A polymer formed from the process of claim 20.

The invention claimed is:

1. A composition comprising:

(i) a supported aluminoxane intermediate composition prepared by:

a) a support; b) an organoaluminum compound; and c) an oxygen source

(ii) a compound having the formula $R^1(X)_n$; wherein R^1 is a hydrocarbyl group having from about 1 to about 20 carbon atoms; n is from 1 to the number of possible substitutions of the hydrocarbyl group and each X are optionally substituted on R^1 and is independently halogen, —$OSi(R^2)_3$, —$N(Si(R^2)_3)_2$, —$N(R^2)_2$; —SR^2; —$P(R^2)_2$; —CN, or —OR^3; wherein each R^2 is independently hydrogen or a hydrocarbyl group having from about 1 to about 20 carbon atoms; each R^3 is independently a hydrocarbyl having from 1 to 20 carbon atoms, wherein when at least one R^2 is a hydrocarbyl group; R^1 and R^2 or R^1 and R^3 are optionally linked together to form a cyclic group; provided that at least one X is not directly bonded to an aryl group, and provided that when X is not halogen, X is bonded to a secondary or tertiary carbon, or a —CH_2-aryl group; and

(iii) a trihydrocarbylaluminum compound having the formula AlR_3, wherein each R is independently a C_1-C_{20} hydrocarbyl group.

2. The composition of claim **1**, wherein R is C_1-C_8 alkyl, R^1 is a C_3-C_8 alkyl or C_7-C_{15} aralkyl, n is 1 to 3, X is halogen or —OR^2, and R^2 is a C_1-C_4 alkyl or C_6-C_{15} aralkyl.

3. The composition of claim **1**, wherein $R^1(X)_n$ is $(R^4)_3C$—OR^5 or $(R^4)_3C$—$N(R^5)_2$; wherein each R^4 is independently a hydrogen or a hydrocarbyl group having from about 1 to about 20 carbon atoms and at least one R^4 is a hydrocarbyl group; R^5 is a hydrocarbyl group having from about 1 to about 20 carbon atoms; or R^4 and R^5 are optionally linked together to form a cyclic group.

4. The composition of claim **1**, wherein $R^1(X)_n$ is: Me_3CF, Me_3SiF, $C_6H_5CH_2F$, $C_6H_5CF_3$ 1,3-$C_6H_4(CF_3)_2$, ^{t}Bu-OMe, 1,2-$(^t$BuO$)_2C_6H_4$; 1,3-$(^t$BuO$)_2C_6H_4$; 1,4-$(^t$BuO$)_2C_6H_4$; ^{t}BuO—CH_2—CH_2—O^{t}Bu; 1-methyl-tetrahydrofuran, 1,2-dimethyl-tetrahydrofuran or mixtures thereof, wherein C_6H_4 is a phenylene group and ^{t}Bu is a tertiary-butyl group.

5. The composition of claim **1**, wherein $R^1(X)_n$ is, tertiary-butyl methyl ether, tertiary-butyl ethyl ether, tertiary-butyl propyl ether, tertiary-butyl butyl ether, 1-tert-butoxy-2,6-di-tert-butylbenzene, 1-trimethylsiloxy-2,6-di-tert-butylbenzene, trimethylsiloxybenzene, trimethylmethoxysilane, benzylmethyl ether, benzyl ethyl ether, benzylpropyl ether, benzyl butyl ether or mixtures thereof.

6. The composition of claim **1**, wherein $R^1(X)_n$ is ethylene oxide, propylene oxide, isobutene oxide, 1-butene oxide, styrene oxide, 4-methyl-styrene oxide, 2,2-dimethyl-trimethylene oxide, 2,2-diphenyl-trimethylene oxide, 1-methyl-ethyl-eneimine, 1,1,2-trimethylethylenimine, 1,1-diphenyl-2-methyl-ethylenimine, 1-methyl-tetrahydro-pyrrole, 1,1,2-trimethyl-tetrahydro-pyrrole, 1,1-diphenyl-2-methyl-tetrahydro-pyrrole, 1-methyl-piperidine, 1,1,2-trimethyl-piperidine, 1,1-diphenyl-2-methyl-piperidine, or mixtures thereof.

7. The composition of claim **1**, wherein the aluminoxane on a support comprises methylaluminoxane, neopentylaluminoxane, benzylaluminoxane, ethylaluminoxane, n-butylaluminoxane, or isobutylaluminoxane.

8. The composition of claim **1**, wherein the trihydrocarbylaluminum compound is trimethylaluminum, trineopentylaluminum, tribenzylaluminum, triethylaluminum, tripropylaluminum, tributylaluminum, triisobutylaluminum, tri-n-octylaluminum or mixtures thereof.

9. The composition of claim **1**, wherein the support is silica, alumina, silica-alumina, clay, a modified clay composition, or any combination thereof.

10. The composition of claim **1**, wherein the mole ratio of the compound of formula $R^1(X)_n$ to the trihydrocarbylaluminum compound is about 0.01:1 to 2:1 and the mole ratio of X in the compound of formula $R^1(X)_n$ to Al in the supported aluminoxane is about 0.01:1 to 0.8:1.

11. The composition of claim **1**, further comprising a transition metal component.

12. A composition comprising:

(i) a trihydrocarbylaluminum compound having the formula AlR_3, wherein each R is independently a C_1-C_{20} alkyl;

(ii) a compound having the formula $R^1(X)_n$; wherein R^1 is a hydrocarbyl group having from about 3 to about 20 carbon atoms; n is from 1 to the number of possible substitutions of the hydrocarbyl group and each X are optionally substituted on R^1 and is independently, —OSi$(R^2)_3$, —N$(Si(R^2)_3)_2$, —N$(R^2)_2$; —SR^2; —P$(R^2)_2$; —CN, or —OR^3; wherein each R^2 is independently hydrogen or a hydrocarbyl group having from about 1 to about 20 carbon atoms;

each R^3 is independently a hydrocarbyl having from 1 to 20 carbon atoms, wherein when at least one R^2 is a hydrocarbyl group; R^1 and R^2 or R^1 and R^3 are optionally linked together to form a cyclic group; provided that at least one X is not directly bonded to an aryl group, and provided that X is bonded to a secondary or tertiary carbon, or a —CH_2-aryl group; and

(iii) an aluminoxane.

13. The composition of claim **12**, wherein R is C_1-C_8 alkyl, R^1 is a C_3-C_8 alkyl or C_7-C_{15} aralkyl, n is 1 to 3, X is —OR^2, and R^2 is a C_1-C_4 alkyl or C_6-C_{15} aralkyl.

14. The composition of claim **12**, wherein $R^1(X)_n$ is $(R^4)_3C$—OR^5 or $(R^4)_3C$—$N(R^5)_2$; wherein each R^4 is independently a hydrogen or a hydrocarbyl group having from about 1 to about 20 carbon atoms and at least one R^4 is a hydrocarbyl group; R^5 is a hydrocarbyl group having from about 1 to about 20 carbon atoms; or R^4 and R^5 may be linked together to form a cyclic group.

15. The composition of claim **12**, wherein $R^1(X)_n$ is ^{t}Bu-OMe, 1,2-(^{t}BuO)$_2$C$_6$H$_4$; 1,3-(^{t}BuO)$_2$C$_6$H$_4$; 1,4-(^{t}BuO)$_2$ C$_6$H$_4$; ^{t}BuO—CH$_2$—CH$_2$—O^{t}Bu; 1-methyl-tetrahydrofuran, 1,2-dimethyl-tetrahydrofuran or mixtures thereof, wherein C_6H_4 is a phenylene group and ^{t}Bu is a tertiary-butyl group.

16. The composition of claim **12**, wherein the mole ratio of the compound of formula $R^1(X)_n$ to the trihydrocarbylaluminum compound is about 0.01:1 to 0.1:1 and the mole ratio of X in the compound of formula $R^1(X)_n$ to Al in the non-supported solution aluminoxane is about 0.01:1 to 0.8:1.

17. The composition of claim **12**, further comprising a carrier.

18. The composition of claim **12**, further comprising a transition metal component.