CLAIMS

We claim:

1. A process comprising:

introducing a catalyst solution, via a first line, into a reactor, the catalyst solution comprising a catalyst and a first non-aromatic diluent;

introducing an activator solution, via a second line, into the reactor, the activator solution comprising an activator and a second non-aromatic diluent, wherein the second non-aromatic diluent is the same as or different than the first non-aromatic diluent;

operating the reactor under process conditions; and

obtaining an effluent from the reactor, the effluent comprising a polyolefin,

wherein the first line and the second line are coupled with the reactor.

2. The process of claim 1, wherein the catalyst solution is free of the activator.

3. The process of any preceding claim ~~1~~, wherein the activator solution is free of the catalyst.

4. The process of any preceding claim ~~1~~, wherein the catalyst solution consists of the catalyst and the non-aromatic diluent.

5. The process of any preceding claim ~~1~~, wherein the activator solution consists of the activator and the non-aromatic diluent.

6. The process of any preceding claim ~~1~~, wherein the first non-aromatic diluent is selected from the group consisting of 2-methyl-pentane, isobutane, butane, n-pentane, isopentane, hexanes, isohexane, heptane, octane, dodecane, and mixture(s) thereof.

~~7. The process of claim 6, wherein the first non-aromatic diluent is 2-methyl-pentane.~~

~~8.~~7. The process of any preceding claim ~~1~~, wherein the second non-aromatic diluent is selected from the group consisting of 2-methyl-pentane, isobutane, butane, n-pentane, isopentane, hexanes, isohexane, heptane, octane, dodecane, and mixture(s) thereof.

~~9. The process of claim 8, wherein the second non-aromatic diluent is 2-methyl-pentane.~~

~~10.~~8. The process of any preceding claim ~~1~~, wherein the first non-aromatic diluent has about 1 wt% or less aromatics, based on the weight of first non-aromatic diluent + aromatics.

~~11. The process of claim 10, wherein the first non-aromatic diluent has 0 wt% aromatics, based on the weight of first non-aromatic diluent + aromatics.~~

~~12.~~9. The process of any preceding claim ~~1~~, wherein the second non-aromatic diluent has about 1 wt% or less aromatics, based on the weight of second non-aromatic diluent + aromatics.

~~13. The process of claim 12, wherein the second non-aromatic diluent has 0 wt% aromatics, based on the weight of second non-aromatic diluent + aromatics.~~

~~14.~~10. The process of any preceding claim ~~1~~, wherein the activator solution comprises the activator in an amount of about 0.01 wt% to about 20 wt%, based on the weight of the activator solution.

~~15.~~11. The process of claim ~~14~~ 10, wherein the activator solution comprises the activator in an amount of about 0.15 wt% to about 0.3 wt%, based on the weight of the activator solution.

~~16.~~12. The process of any preceding claim ~~1~~, wherein introducing the activator solution to the reactor is performed at a feed rate of:

about 0.01 kg/hr to about 40 kg/hr, or

about 0.02 L/hr to about 60 L/hr.

~~17.~~13. The process of any preceding claim ~~1~~, wherein the catalyst solution comprises the catalyst in an amount of about 0.01 wt% to about 20 wt%, based on the weight of the catalyst solution.

~~18.~~14. The process of claim ~~17~~ 13, wherein the catalyst solution comprises the catalyst in an amount of about 0.05 wt% to about 0.1 wt%, based on the weight of the catalyst solution.

~~19.~~15. The process of any preceding claim ~~1~~, wherein introducing the catalyst solution to the reactor is performed at a feed rate of:

about 0.003 kg/hr to about 40 kg/hr, or

about 0.004 L/hr to about 60 L/hr.

~~20.~~16. The process of any preceding claim ~~1~~, wherein the process conditions comprise a temperature delta of about 0 ºC to about 20 ºC during a substantial entirety of the process.

~~21. The process of claim 20, wherein the temperature delta is about 1 ºC to about 3 ºC during a substantial entirety of the process.~~

~~22.~~17. The process of any preceding claim ~~1~~, wherein the effluent has an aromatic content of about 1 wt% or less, based on the weight of the effluent.

~~23.~~18. The process of any preceding claim ~~1~~, wherein the polyolefin has an aromatic content of about 1 wt% or less, based on the weight of the polyolefin.

~~24. The process of claim 23, wherein the polyolefin has an aromatic content of 0 wt%, based on the weight of the polyolefin.~~

~~25.~~19. The process of any preceding claim ~~1~~, wherein:

the process conditions comprise a temperature of about 130 ºC to about 200 ºC and a pressure of about 100 bar to about 130 bar, and

the polyolefin is a plastomer.

~~26. The process of claim 1, wherein:~~

~~the process conditions comprise a temperature of about 85 ºC to bout 150 ºC and a pressure of about 100 bar to about 130 bar, and~~

~~the polyolefin is an elastomer.~~

~~27. The process of claim 1, wherein:~~

~~the process conditions comprise a temperature of about 50 ºC to about 80 ºC and a pressure of about 100 bar to about 130 bar, and~~

~~the polyolefin is a propylene-based polymer.~~

~~28. The process of claim 1, wherein the catalyst is represented by the formula:~~

$Cp^ACp^BM'X'_n$

wherein each Cp^A and Cp^B is independently selected from cyclopentadienyl ligands or ligands isolobal to cyclopentadienyl, one or both Cp^A and Cp^B optionally contain heteroatoms, and one or both Cp^A and Cp^B are optionally substituted by one or more R" groups; M' is selected from Groups 3 through 12 atoms and lanthanide Group atoms; X' is an anionic leaving group; n is 0 or an integer from 1 to 4; each R" is independently selected from alkyl, heteroalkyl, alkenyl, heteroalkenyl, alkynyl, heteroalkynyl, alkoxy, aryloxy, alkylthio, arylthio, aryl, heteroaryl, aralkyl, aralkylene, alkaryl, alkarylene, haloalkyl, haloalkenyl, haloalkynyl, heteroalkyl, heterocyclyl, silyl, boryl, phosphino, phosphine, amino, ether, and thioether.

29. The process of claim 1, wherein the catalyst is represented by the formula:

$Cp^A(T)Cp^BM'X'_n$

wherein each Cp^A and Cp^B is independently selected from cyclopentadienyl ligands or ligands isolobal to cyclopentadienyl, one or both Cp^A and Cp^B optionally contain heteroatoms, and one or both Cp^A and Cp^B are optionally substituted by one or more R" groups; M' is selected from Groups 3 through 12 atoms and lanthanide Group atoms; X' is an anionic leaving group; n is 0 or an integer from 1 to 4; (T) is a bridging group selected from divalent alkyl, divalent heteroalkyl, divalent alkenyl, divalent heteroalkenyl, divalent alkynyl, divalent heteroalkynyl, divalent alkoxy, divalent aryloxy, divalent alkylthio, divalent arylthio, divalent aryl, divalent heteroaryl, divalent aralkyl, divalent aralkylene, divalent alkaryl, divalent alkarylene, divalent haloalkyl, divalent haloalkenyl, divalent haloalkynyl, divalent heteroalkyl, divalent heterocyclyl, divalent silyl, divalent boryl, divalent phosphino, divalent phosphine, divalent amino, divalent ether, divalent thioether; and R" is selected from alkyl, heteroalkyl, alkenyl, heteroalkenyl, alkynyl, heteroalkynyl, alkoxy, aryloxy, alkylthio, arylthio, aryl, heteroaryl, aralkyl, aralkylene, alkaryl, alkarylene, haloalkyl, haloalkenyl, haloalkynyl, heteroalkyl, heterocyclyl, silyl, boryl, phosphino, phosphine, amino, germanium, ether, and thioether.

30. The process of claim 1, wherein the catalyst is selected from the group consisting of:
bis(cyclopentadienyl)zirconium dichloride,
bis(n-butylcyclopentadienyl)zirconium dichloride,
bis(n-butylcyclopentadienyl)zirconium dimethyl,
bis(pentamethylcyclopentadienyl)zirconium dichloride,
bis(pentamethylcyclopentadienyl)zirconium dimethyl,

bis(pentamethylcyclopentadienyl)hafnium dichloride,
bis(pentamethylcyclopentadienyl)zirconium dimethyl,
bis(1-methyl-3-n-butylcyclopentadienyl)zirconium dichloride,
bis(1-methyl-3-n-butylcyclopentadienyl)zirconium dimethyl,
bis(1-methyl-3-n-butylcyclopentadienyl)hafnium dichloride,
bis(1-methyl-3-n-butylcyclopentadienyl)zirconium dimethyl,
bis(indenyl)zirconium dichloride,
bis(indenyl)zirconium dimethyl,
bis(tetrahydro-1-indenyl)zirconium dichloride,
bis(tetrahydro-1-indenyl)zirconium dimethyl,
(n-propyl cyclopentadienyl, pentamethyl cyclopentadienyl)zirconium dichloride, and
(n-propyl cyclopentadienyl, pentamethyl cyclopentadienyl)zirconium dimethyl.

31. The process of claim 1, wherein the catalyst is selected from the group consisting of:
dimethylsilylbis(tetrahydroindenyl)MX_n,
dimethylsilylbis(2-methylindenyl)MX_n,
dimethylsilylbis(2-methylfluorenyl)MX_n,
dimethylsilylbis(2-methyl-5,7-propylindenyl)MX_n,
dimethylsilylbis(2-methyl-4-phenylindenyl)MX_n,
dimethylsilylbis(2-ethyl-5-phenylindenyl)MX_n,
dimethylsilylbis(2-methyl-4-biphenylindenyl)MX_n,
dimethylsilylenebis(2-methyl-4-carbazolylindenyl)MX_n,
rac-dimethylsilyl-bis-(5,6,7,8-tetrahydro-5,5,8,8-tetramethyl-2-methyl-1H-benz(f)indene)MX_n,
diphenylmethylene-(cyclopentadienyl)(fluorenyl)MX_n,
bis(methylcyclopentadienyl)MX_n,
rac-dimethylsilylbis(2-methyl,3-propyl-indenyl)MX_n,
dimethylsilylbis(indenyl)MX_n,
Rac-meso-diphenylsilyl-bis(n-propylcyclopentadienyl)MX_n,
1,1'-bis(4-triethylsilylphenyl)methylene-(cyclopentadienyl)(3,8-di-tertiary-butyl-1-fluorenyl)MX_n-(bridge is considered the 1-position),
bis-trimethylsilylphenyl-methylene(cyclopentadienyl)(di-t-butylfluorenyl)MXn,
bis-trimethylsilylphenyl-methylene(cyclopentadienyl)(fluorenyl)MXn,
bisphenylmethylene(cyclopentadienyl)(dimethylfluorenyl)MXn,

bis(n-propylcyclopentadienyl)MX_n;

bis(n-butylcyclopentadienyl)MX_n;

bis(n-pentylcyclopentadienyl)MX_n;

(n-propyl cyclopentadienyl)(n-butylcyclopentadienyl)MX_n;

bis[(2-trimethylsilylethyl)cyclopentadienyl]MX_n;

bis(trimethylsilyl cyclopentadienyl)MX_n;

dimethylsilylbis(n-propylcyclopentadienyl)MX_n;

dimethylsilylbis(n-butylcyclopentadienyl)MX_n;

bis(1-n-propyl-2-methylcyclopentadienyl)MX_n;

(n-propylcyclopentadienyl)(1-n-propyl-3-n-butylcyclopentadienyl)MX_n;

bis(1-methyl, 3-n-butyl cyclopentadienyl)MX_n;

bis(indenyl)MX_n;

dimethylsilyl (tetramethylcyclopentadienyl)(cyclododecylamido)MX_n;

dimethylsilyl (tetramethylcyclopentadienyl)(t-butylamido)MX_n;

μ-$(CH_3)_2$Si(cyclopentadienyl)(1-adamantylamido)MX_n;

μ-$(CH_3)_2$Si(3-tertbutylcyclopentadienyl)(1-adamantylamido)MX_n;

μ-$(CH_3)_2$(tetramethylcyclopentadienyl)(1-adamantylamido)MX_n;

μ-$(CH_3)_2$Si(tetramethylcyclopentadienyl)(1-adamantylamido)MX_n;

μ-$(CH_3)_2$C(tetramethylcyclopentadienyl)(1-adamantylamido)MX_n;

μ-$(CH_3)_2$Si(tetramethylcyclopentadienyl)(1-tertbutylamido)MX_n;

μ-$(CH_3)_2$Si(fluorenyl)(1-tertbutylamido)MX_n;

μ-$(CH_3)_2$Si(tetramethylcyclopentadienyl)(1-cyclododecylamido)MX_n;

μ-$(C_6H_5)_2$C(tetramethylcyclopentadienyl)(1-cyclododecylamido)MX_n; and

μ-$(CH_3)_2$Si(η^5-2,6,6-trimethyl-1,5,6,7-tetrahydro-*s*-indacen-1-yl)(tertbutylamido)MX_n;

wherein:

M is Ti, Zr, or Hf;

each X is independently selected from the group consisting of halogen, hydride, C_{1-12}-alkyl, C_{2-12}-alkenyl, C_{6-12}-aryl, C_{7-20}-alkylaryl, C_{1-12}-alkoxy, C_{6-16}-aryloxy, C_{7-18}-alkylaryloxy, C_{1-12}-fluoroalkyl, and C_{6-12}-fluoroaryl, and

n is zero or an integer from 1 to 4.

32. The process of claim 1, wherien the catalyst is selected from the group consisting of:

bis(1-methyl, 3-n-butyl cyclopentadienyl) M$(R)_2$;

dimethylsilyl bis(indenyl)M$(R)_2$;

bis(indenyl)$M(R)_2$;

dimethylsilyl bis(tetrahydroindenyl)$M(R)_2$;

bis(n-propylcyclopentadienyl)$M(R)_2$;

dimethylsilyl (tetramethylcyclopentadienyl)(cyclododecylamido)$M(R)_2$;

dimethylsilyl (tetramethylcyclopentadienyl)(cyclododecylamido)$M(R)_2$;

dimethylsilyl (tetramethylcyclopentadienyl)(t-butylamido)$M(R)_2$;

dimethylsilyl (tetramethylcyclopentadienyl)(t-butylamido)$M(R)_2$;

μ-$(CH_3)_2$Si(cyclopentadienyl)(1-adamantylamido)$M(R)_2$;

μ-$(CH_3)_2$Si(3-tertbutylcyclopentadienyl)(1-adamantylamido)$M(R)_2$;

μ-$(CH_3)_2$(tetramethylcyclopentadienyl)(1-adamantylamido)$M(R)_2$;

μ-$(CH_3)_2$Si(tetramethylcyclopentadienyl)(1-adamantylamido)$M(R)_2$;

μ-$(CH_3)_2$C(tetramethylcyclopentadienyl)(1-adamantylamido)$M(R)_2$;

μ-$(CH_3)_2$Si(tetramethylcyclopentadienyl)(1-tertbutylamido)$M(R)_2$;

μ-$(CH_3)_2$Si(fluorenyl)(1-tertbutylamido)$M(R)_2$;

μ-$(CH_3)_2$Si(tetramethylcyclopentadienyl)(1-cyclododecylamido)$M(R)_2$;

μ-$(C_6H_5)_2$C(tetramethylcyclopentadienyl)(1-cyclododecylamido)$M(R)_2$; and

μ-$(CH_3)_2$Si(η^5-2,6,6-trimethyl-1,5,6,7-tetrahydro-*s*-indacen-1-yl)(tertbutylamido)$M(R)_2$;

wherein:

M is Ti, Zr, or Hf; and

R is selected from the group consisting of halogen and C_1 to C_5 alkyl.

33. The process of claim 1, wherein the catalyst is selected from the group consisting of:

dimethylsilyl (tetramethylcyclopentadienyl)(cyclododecylamido)titanium dimethyl;

dimethylsilyl (tetramethylcyclopentadienyl)(cyclododecylamido)titanium dimethyl;

dimethylsilyl (tetramethylcyclopentadienyl)(t-butylamido)titanium dimethyl;

dimethylsilyl (tetramethylcyclopentadienyl)(t-butylamido)titanium dimethyl;

μ-$(CH_3)_2$Si(cyclopentadienyl)(1-adamantylamido)titanium dimethyl;

μ-$(CH_3)_2$Si(3-tertbutylcyclopentadienyl)(1-adamantylamido)titanium dimethyl;

μ-$(CH_3)_2$(tetramethylcyclopentadienyl)(1-adamantylamido)titanium dimethyl;

μ-$(CH_3)_2$Si(tetramethylcyclopentadienyl)(1-adamantylamido)titanium dimethyl;

μ-$(CH_3)_2$C(tetramethylcyclopentadienyl)(1-adamantylamido)titanium dimethyl;

μ-$(CH_3)_2$Si(tetramethylcyclopentadienyl)(1-tertbutylamido)titanium dimethyl;

μ-$(CH_3)_2$Si(fluorenyl)(1-tertbutylamido)titanium dimethyl;

μ-$(CH_3)_2$Si(tetramethylcyclopentadienyl)(1-cyclododecylamido)titanium dimethyl;

~~μ-$(C_6H_5)_2$C(tetramethylcyclopentadienyl)(1-cyclododecylamido)titanium dimethyl; and~~

~~μ-$(CH_3)_2$Si(η^5-2,6,6-trimethyl-1,5,6,7-tetrahydro-*s*-indacen-1-yl)(tertbutylamido)titanium dimethyl.~~

~~34. The process of claim 1, wherein the catalyst is selected from the group consisting of:~~
~~bis(1-methyl, 3-n-butyl cyclopentadienyl)hafnium dimethyl,~~
~~bis(1-methyl, 3-n-butyl cyclopentadienyl)zirconium dimethyl,~~
~~dimethylsilyl bis(indenyl)zirconium dimethyl,~~
~~dimethylsilyl bis(indenyl)hafnium dimethyl,~~
~~bis(indenyl)zirconium dimethyl,~~
~~bis(indenyl)hafnium dimethyl,~~
~~dimethylsilyl bis(tetrahydroindenyl)zirconium dimethyl,~~
~~bis(n-propylcyclopentadienyl)zirconium dimethyl,~~
~~dimethylsilylbis(tetrahydroindenyl)hafnium dimethyl,~~
~~dimethylsilyl bis(2-methylindenyl)zirconium dimethyl,~~
~~dimethylsilyl bis(2-methylfluorenyl)zirconium dimethyl,~~
~~dimethylsilyl bis(2-methylindenyl)hafnium dimethyl,~~
~~dimethylsilyl bis(2-methylfluorenyl)hafnium dimethyl,~~
~~dimethylsilyl bis(2-methyl-5,7-propylindenyl) zirconium dimethyl,~~
~~dimethylsilyl bis(2-methyl-4-phenylindenyl) zirconium dimethyl,~~
~~dimethylsilyl bis(2-ethyl-5-phenylindenyl) zirconium dimethyl,~~
~~dimethylsilyl bis(2-methyl-4-biphenylindenyl) zirconium dimethyl,~~
~~dimethylsilylenebis(2-methyl-4-carbazolylindenyl) zirconium dimethyl,~~
~~*rac*-dimethylsilyl bis-(5,6,7,8-tetrahydro-5,5,8,8-tetramethyl-2-methyl-1H-benz(f)indene)hafnium dimethyl,~~
~~diphenylmethylene (cyclopentadienyl)(fluorenyl)hafnium dimethyl,~~
~~bis(methylcyclopentadienyl)zirconium dimethyl,~~
~~rac-dimethylsilylbis(2-methyl,3-propyl indenyl)hafnium dimethyl,~~
~~dimethylsilylbis(indenyl)hafnium dimethyl,~~
~~dimethylsilylbis(indenyl)zirconium dimethyl,~~
~~dimethyl *rac*-dimethylsilyl bis-(5,6,7,8-tetrahydro-5,5,8,8-tetramethyl-2-methyl-1H-benz(f)indene)hafnium dimethyl,~~
~~*Rac-meso*-diphenylsilyl bis(n-propylcyclopentadienyl)hafnium dimethyl,~~

~~1,1'-bis(4-triethylsilylphenyl)methylene-(cyclopentadienyl)(3,8-di-tertiary-butyl-1-fluorenyl)hafnium X_n (bridge is considered the 1 position),~~
~~bis-trimethylsilylphenyl methylene(cyclopentadienyl)(di-t-butylfluorenyl)hafnium dimethyl,~~
~~bis-trimethylsilylphenyl methylene(cyclopentadienyl)(fluorenyl)hafnium dimethyl,~~
~~bisphenylmethylene(cyclopentadienyl)(dimethylfluorenyl)hafnium dimethyl,~~
~~bis(n-propylcyclopentadienyl)hafnium dimethyl,~~
~~bis(n-butylcyclopentadienyl)hafnium dimethyl,~~
~~bis(n-pentylcyclopentadienyl)hafnium dimethyl,~~
~~(n-propyl cyclopentadienyl)(n-butylcyclopentadienyl)hafnium dimethyl,~~
~~bis[(2-trimethylsilylethyl)cyclopentadienyl]hafnium dimethyl,~~
~~bis(trimethylsilyl cyclopentadienyl)hafnium dimethyl,~~
~~dimethylsilylbis(n-propylcyclopentadienyl)hafnium dimethyl,~~
~~dimethylsilylbis(n-butylcyclopentadienyl)hafnium dimethyl,~~
~~bis(1-n-propyl-2-methylcyclopentadienyl)hafnium dimethyl,~~
~~(n-propylcyclopentadienyl)(1-n-propyl-3-n-butylcyclopentadienyl)hafnium dimethyl,~~
~~bis(n-propylcyclopentadienyl)hafnium dimethyl,~~
~~bis(n-butylcyclopentadienyl)hafnium dimethyl,~~
~~bis(n-pentylcyclopentadienyl)hafnium dimethyl,~~
~~(n-propyl cyclopentadienyl)(n-butylcyclopentadienyl)hafnium dimethyl,~~
~~bis[(2-trimethylsilylethyl)cyclopentadienyl]hafnium dimethyl,~~
~~bis(trimethylsilyl cyclopentadienyl)hafnium dimethyl,~~
~~dimethylsilylbis(n-propylcyclopentadienyl)hafnium dimethyl,~~
~~dimethylsilylbis(n-butylcyclopentadienyl)hafnium dimethyl,~~
~~bis(1-n-propyl-2-methylcyclopentadienyl)hafnium dimethyl,~~
~~(n-propylcyclopentadienyl)(1-n-propyl-3-n-butylcyclopentadienyl)hafnium dimethyl, and~~
~~dimethylsilyl(3-n-propylcyclopentadienyl)(tetramethylcyclopentadienyl)zirconium dimethyl.~~

~~35. The process of claim 31, wherein the catalyst is selected from the group consisting of:~~
~~dimethylsilyl bis(indenyl)zirconium dimethyl, and~~
~~dimethylsilyl bis(indenyl)hafnium dimethyl.~~

~~36.~~20. The process of any preceding claim ~~1~~, wherein the activator is represented by Formula (**AI**):

$$[R^1R^2R^3EH]_d^+[M^{k+}Q_n]^{d-} \qquad (\mathbf{AI})$$

wherein:

E is nitrogen or phosphorous;

each d is the same and is 1, 2 or 3;

k is 1, 2, or 3;

n is 1, 2, 3, 4, 5, or 6;

n - k = d;

each of R^1, R^2, and R^3 is independently selected from the group consisting of H, C_1-C_{40} alkyl, and C_5-C_{50}-aryl; wherein R^1, R^2, and R^3 together comprise 15 or more carbon atoms;

M is an element selected from group 13 of the Periodic Table of the Elements; and

each Q is independently selected from the group consisting of hydrogen, bridged or unbridged dialkylamido, halide, alkoxide, aryloxide, hydrocarbyl, halocarbyl.

~~37. The process of claim 36, wherein:~~

~~E is nitrogen,~~

~~M is boron, and~~

~~n is 4.~~

~~38. The process of claim 37, wherein each Q is a fluorinated aryl group.~~

~~39. The process of claim 38, wherein each Q is perfluoronaphthyl.~~

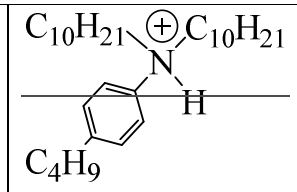
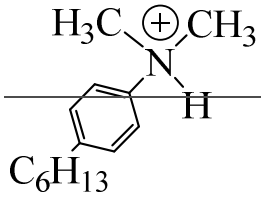
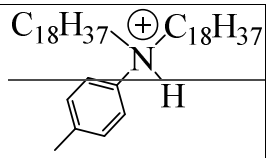
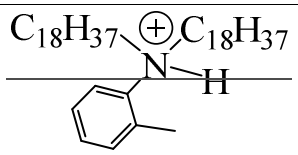
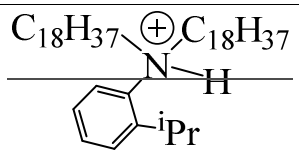
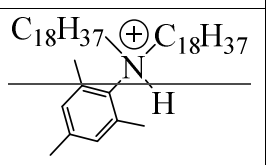
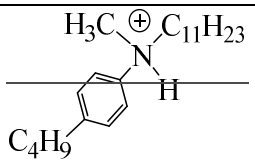
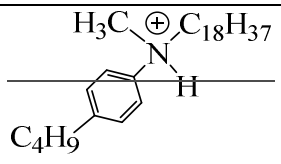
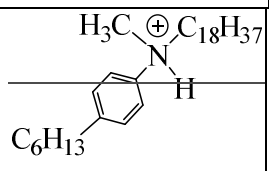
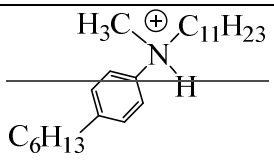
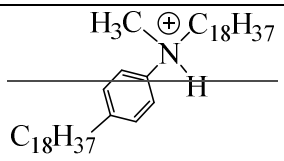
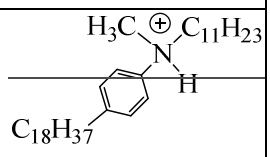
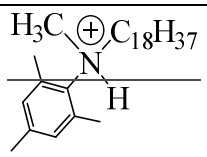
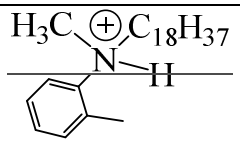
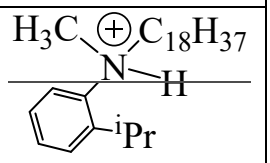
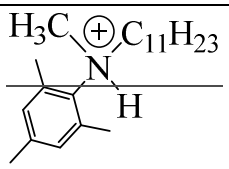
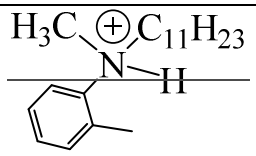
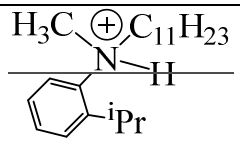
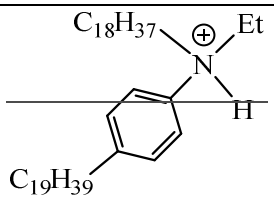
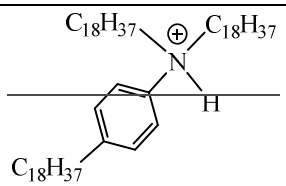
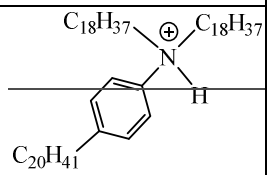
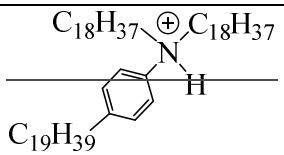
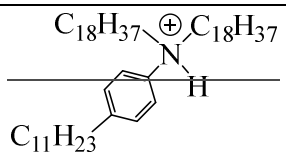
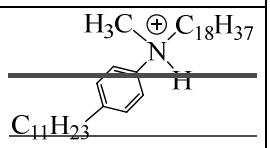
~~40. The process of claim 36, wherein R^1 of Formula (**AI**) is a C_1-C_{30} alkyl group, and each of R^2 and R^3 of Formula (**AI**) is independently branched or linear C_1-C_{40} alkyl group or meta and or para substituted phenyl group, wherein the meta or para substituents are, independently, a C_1 to C_{40} hydrocarbyl group, an alkoxy group, a silyl group, a halogen, or a halogen containing group.~~

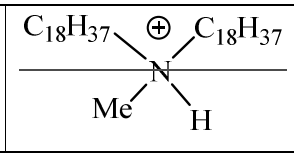
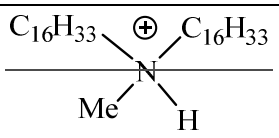
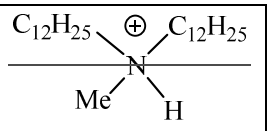
~~41. The process of claim 36, wherein R^1, R^2, and R^3 together comprise 35 or more carbon atoms.~~

~~42. The process of claim 41, wherein:~~

~~R^1 is selected from the group consisting of methyl, ethyl, propyl, butyl, and pentyl, and each of R^2 and R^3 is independently C_1-C_{40} branched or linear alkyl or C_5-C_{50} aryl.~~

~~43. The process of claim 36, wherein $[R^1R^2R^3EH]$ of Formula (**AI**) is selected from the group consisting of:~~

~~1~~		~~2~~		~~3~~	
~~4~~		~~5~~		~~6~~	
~~7~~		~~8~~		~~9~~	
~~10~~		~~11~~		~~12~~	
~~13~~		~~14~~		~~15~~	
~~16~~		~~17~~		~~18~~	
~~19~~		~~20~~		~~21~~	
~~22~~		~~23~~		~~24~~	

~~25~~		~~26~~		~~27~~	

~~44. The process of claim 1, wherein the activator is selected from the group consisting of:~~

~~*N,N* di(hydrogenated tallow)methylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-nonadecyl-*N* octadecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-hexadecyl-*N* octadecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-tetradecyl-*N* octadecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-dodecyl-*N* octadecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-decyl-*N* octadecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-octyl-*N* octadecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-hexyl-*N* octadecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-butyl-*N* octadecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-octadecyl-*N* decylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-nonadecyl-*N* dodecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-nonadecyl-*N* tetradecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-nonadecyl-*N* hexadecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-4-nonadecyl-*N* octadecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* ethyl-4-nonadecyl-*N* octadecylanilinium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-*N,N* dioctadecylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N*-methyl-*N,N*-dihexadecylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-*N,N* ditetradecylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-*N,N* didodecylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-*N,N* didecylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N* methyl-*N,N* dioctylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N* ethyl-*N,N* dioctadecylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N,N* di(octadecyl)tolylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N,N*-di(hexadecyl)tolylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N,N*-di(tetradecyl)tolylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N,N*-di(dodecyl)tolylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N*-octadecyl-N-hexadecyl-tolylammonium [tetrakis(perfluorophenyl)borate],~~

~~*N*-octadecyl-N-hexadecyl-tolylammonium [tetrakis(perfluorophenyl)borate],~~

N-octadecyl-N-tetradecyl-tolylammonium [tetrakis(perfluorophenyl)borate],
N-octadecyl-N-dodecyl-tolylammonium [tetrakis(perfluorophenyl)borate],
N-octadecyl-N-decyl-tolylammonium [tetrakis(perfluorophenyl)borate],
N-hexadecyl-N-tetradecyl-tolylammonium [tetrakis(perfluorophenyl)borate],
N-hexadecyl-N-dodecyl-tolylammonium [tetrakis(perfluorophenyl)borate],
N-hexadecyl-N-decyl-tolylammonium [tetrakis(perfluorophenyl)borate],
N-tetradecyl-N-dodecyl-tolylammonium [tetrakis(perfluorophenyl)borate],
N-tetradecyl-N-decyl-tolylammonium [tetrakis(perfluorophenyl)borate],
N-dodecyl-N-decyl-tolylammonium [tetrakis(perfluorophenyl)borate],
N-methyl-N-octadecylanilinium [tetrakis(perfluorophenyl)borate],
N-methyl-N-hexadecylanilinium [tetrakis(perfluorophenyl)borate],
N-methyl-N-tetradecylanilinium [tetrakis(perfluorophenyl)borate],
N-methyl-N-dodecylanilinium [tetrakis(perfluorophenyl)borate],
N-methyl-N-decylanilinium [tetrakis(perfluorophenyl)borate], and
N-methyl-N-octylanilinium [tetrakis(perfluorophenyl)borate].

45. The process of claim 1, wherein the activator is selected from the group consisting of:
N,N-di(hydrogenated tallow)methylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-nonadecyl-*N*-octadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-hexadecyl-*N*-octadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-tetradecyl-*N*-octadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-dodecyl-*N*-octadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-decyl-*N*-octadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-octyl-*N*-octadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-hexyl-*N*-octadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-butyl-*N*-octadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-octadecyl-*N*-decylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-nonadecyl-*N*-dodecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-nonadecyl-*N*-tetradecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-nonadecyl-*N*-hexadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-4-nonadecyl-*N*-octadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-ethyl-4-nonadecyl-*N*-octadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-*N,N*-dioctadecylammonium tetrakis(perfluoronaphthalen-2-yl)borate,

N-methyl-*N*,*N*-dihexadecylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-*N*,*N*-ditetradecylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-*N*,*N*-didodecylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-*N*,*N*-didecylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-*N*,*N*-dioctylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-ethyl-*N*,*N*-dioctadecylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N,*N*-di(octadecyl)tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N,*N*-di(hexadecyl)tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N,*N*-di(tetradecyl)tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N,*N*-di(dodecyl)tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-octadecyl-N-hexadecyl-tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-octadecyl-N-hexadecyl-tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-octadecyl-N-tetradecyl-tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-octadecyl-N-dodecyl-tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-octadecyl-N-decyl-tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-hexadecyl-N-tetradecyl-tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-hexadecyl-N-dodecyl-tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-hexadecyl-N-decyl-tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-tetradecyl-N-dodecyl-tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-tetradecyl-N-decyl-tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-dodecyl-N-decyl-tolylammonium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-N-octadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-N-hexadecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-N-tetradecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-N-dodecylanilinium tetrakis(perfluoronaphthalen-2-yl)borate,
N-methyl-N-decylanilinium tetrakis(perfluoronaphthalen-2-yl)borate, and
N-methyl-N-octylanilinium tetrakis(perfluoronaphthalen-2-yl)borate.

46. The process of claim 1, wherein the polyolefin has:

an ethylene content of about 9 wt% with the balance being propylene;

a density of about 0.879 g/cm^3 (ASTM D1505);

a melt index of about 3.6 g/10 min (ASTM D1238; 190°C, 2.16 kg);

a melt mass flow rate of about 8 g/10 min (230°C, 2.16 kg);

a Shore D hardness of about 34 (ASTM D2240); and

a Vicat softening temperature (VST) of about 77.3°C.

47. The process of claim 1, wherein the polyolefin has:

an ethylene content of about 11 wt% with the balance being propylene;

a density of about 0.873 g/cm^3 (ASTM D1505);

a melt index of about 3.7 g/10 min (ASTM D1238; 190°C, 2.16 kg);

a melt mass flow rate of about 8 g/10 min (230°C, 2.16 kg);

a Shore D hardness of about 27 (ASTM D2240); and

a Vicat softening temperature (VST) of about 65.1°C.

48. The process of claim 1, wherein the polyolefin has:

an ethylene content of about 4 wt% with the balance being propylene;

a density of about 0.889 g/cm^3 (ASTM D1505);

a melt mass flow rate of about 8 g/10 min (230°C, 2.16 kg);

a Shore D hardness of about 50 (ASTM D2240); and

a Vicat softening temperature (VST) of about 103°C.

49. The process of claim 1, wherein the polyolefin is a propylene-ethylene copolymer having:

a density of about 0.863 g/cm^3 (ASTM D1505),

a melt index of about 9.1 g/10 min (ASTM D1238; 190°C, 2.16 kg),

a melt flow rate of about 20 g/10 min, and

an ethylene content of about 15 wt%.

50. The process of claim 1, wherein the polyolefin is a propylene-ethylene copolymer having:

a density of about 0.862 g/cm^3 (ASTM D1505),

a melt index of about 1.4 g/10 min (ASTM D1238; 190°C, 2.16 kg),

a melt flow rate of about 3 g/10min, and

an ethylene content of about 16 wt%.

51. The process of claim 1, wherein the polyolefin is a propylene-ethylene copolymer having:

a density of about 0.874 g/cm^3 (ASTM D1505),

~~a melt index of about 1.1 g/10 min (ASTM D1238; 190°C, 2.16 kg),~~
~~a melt flow rate of about 3 g/10 min, and~~
~~an ethylene content of about 11 wt%.~~

~~52. The process of claim 1, wherein the polyolefin has:~~
~~isotactic propylene repeat units,~~
~~a density of about 0.865 g/cm^3,~~
~~a melt mass flow rate of about 45.2 g/10 min (230 °C, 2.16 kg), and~~
~~an ethylene content of about 13.1 wt%.~~