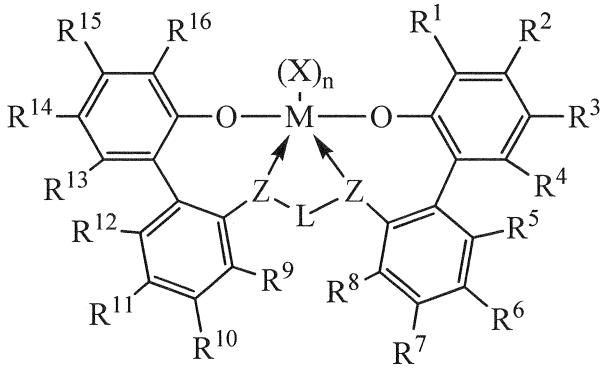
We Claim:

1. A procatalyst comprising a metal-ligand complex of formula (I):



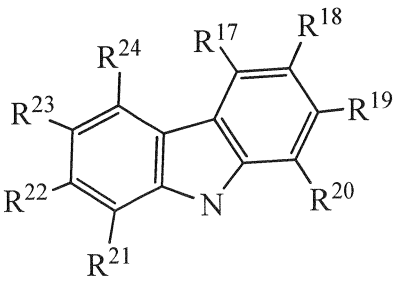
(I)

wherein:

M is titanium, zirconium, or hafnium, each independently being in a formal oxidation state of +2, +3, or +4; and n is an integer of from 0 to 3, and wherein when n is 0, X is absent; each X independently is a monodentate ligand that is neutral, monoanionic, or dianionic; or two Xs are taken together to form a bidentate ligand that is neutral, monoanionic, or dianionic; and X and n are chosen in such a way that the metal-ligand complex of formula (I) is, overall, neutral; each Z independently is O, S, $N(C_1\text{-}C_{40})$hydrocarbyl, or $P(C_1\text{-}C_{40})$hydrocarbyl; and L is $(C_3\text{-}C_{40})$hydrocarbylene or $(C_3\text{-}C_{40})$heterohydrocarbylene, wherein the $(C_3\text{-}C_{40})$hydrocarbylene has a portion that comprises a 3-carbon atom to 10-carbon atom linker backbone linking the Z atoms in formula (I) (to which L is bonded), wherein each of the 3 to 10 atoms of the 3-atom to 10-atom linker backbone of the $(C_3\text{-}C_{40})$heterohydrocarbylene independently is a carbon atom, O, S, S(O), $S(O)_2$, $Si(R^C)_2$, $Ge(R^C)_2$, $P(R^P)$, or $N(R^N)$, wherein independently each R^C is $(C_1\text{-}C_{30})$hydrocarbyl, each R^P is $(C_1\text{-}C_{30})$hydrocarbyl; and each R^N is $(C_1\text{-}C_{30})$hydrocarbyl or absent; and

$R^{1\text{-}24}$ are selected from the group consisting of a $(C_1\text{-}C_{40})$hydrocarbyl, $(C_1\text{-}C_{40})$heterohydrocarbyl, $Si(R^C)_3$, $Ge(R^C)_3$, $P(R^P)_2$, $N(R^N)_2$, OR^C, SR^C, NO_2, CN, CF_3, $R^CS(O)$-, $R^CS(O)_2$-, $(R^C)_2C$=N-, $R^CC(O)O$-, $R^COC(O)$-, $R^CC(O)N(R)$-,

$(R^C)_2NC(O)$-, halogen atom, hydrogen atom, and combination thereof; and, wherein at least R^1, R^{16}, or both comprise formula (II), and preferably R^1 and R^{16} are the same;



(II).

when R^{22} is H, then R^{19} is a $(C_1\text{-}C_{40})$hydrocarbyl; $(C_1\text{-}C_{40})$heterohydrocarbyl; $Si(R^C)_3$, $Ge(R^C)_3$, $P(R^P)_2$, $N(R^N)_2$, OR^C, SR^C, NO_2, CN, CF_3, $R^CS(O)$-, $R^CS(O)_2$-, $(R^C)_2C$=N-, $R^CC(O)O$-, $R^COC(O)$-, $R^CC(O)N(R)$-, $(R^C)_2NC(O)$- or halogen atom;

when R^{19} is H, then R^{22} is a $(C_1\text{-}C_{40})$hydrocarbyl; $(C_1\text{-}C_{40})$heterohydrocarbyl; $Si(R^C)_3$, $Ge(R^C)_3$, $P(R^P)_2$, $N(R^N)_2$, OR^C, SR^C, NO_2, CN, CF_3, $R^CS(O)$-, $R^CS(O)_2$-, $(R^C)_2C$=N-, $R^CC(O)O$-, $R^COC(O)$-, $R^CC(O)N(R)$-, $(R^C)_2NC(O)$- or halogen atom;

preferably, R^{22} and R^{19} are both a $(C_1\text{-}C_{40})$hydrocarbyl; $(C_1\text{-}C_{40})$heterohydrocarbyl; $Si(R^C)_3$, $Ge(R^C)_3$, $P(R^P)_2$, $N(R^N)_2$, OR^C, SR^C, NO_2, CN, CF_3, $R^CS(O)$-, $R^CS(O)_2$-, $(R^C)_2C$=N-, $R^CC(O)O$-, $R^COC(O)$-, $R^CC(O)N(R)$-, $(R^C)_2NC(O)$- or halogen atom;

when R^8 is H, then R^9 is a $(C_1\text{-}C_{40})$hydrocarbyl; $(C_1\text{-}C_{40})$heterohydrocarbyl; $Si(R^C)_3$, $Ge(R^C)_3$, $P(R^P)_2$, $N(R^N)_2$, OR^C, SR^C, NO_2, CN, CF_3, $R^CS(O)$-, $R^CS(O)_2$-, $(R^C)_2C$=N-, $R^CC(O)O$-, $R^COC(O)$-, $R^CC(O)N(R)$-, $(R^C)_2NC(O)$- or halogen atom;

when R^9 is H, then R^8 is a $(C_1\text{-}C_{40})$hydrocarbyl; $(C_1\text{-}C_{40})$heterohydrocarbyl; $Si(R^C)_3$, $Ge(R^C)_3$, $P(R^P)_2$, $N(R^N)_2$, OR^C, SR^C, NO_2, CN, CF_3, $R^CS(O)$-, $R^CS(O)_2$-, $(R^C)_2C$=N-, $R^CC(O)O$-, $R^COC(O)$-, $R^CC(O)N(R)$-, $(R^C)_2NC(O)$- or halogen atom;

optionally two or more R groups (for example, from R^{9-15}, R^{9-13}, R^{9-12}, R^{2-8}, R^{4-8}, R^{5-8}) can combine together into ring structures, with such ring structures having from 3 to 50 atoms in the ring excluding any hydrogen atoms,

each of the the aryl, heteroaryl, hydrocarbyl, heterohydrocarbyl, $Si(R^C)_3$, $Ge(R^C)_3$, $P(R^P)_2$, $N(R^N)_2$, OR^C, SR^C, $R^CS(O)$-, $R^CS(O)_2$-, $(R^C)_2C$=N-, $R^CC(O)O$-, $R^COC(O)$-, $R^CC(O)N(R)$-, $(R^C)_2NC(O)$-, hydrocarbylene, and heterohydrocarbylene groups independently is unsubstituted or substituted with one or more R^S substituents; and

each R^S independently is a halogen atom, polyfluoro substitution, perfluoro substitution, unsubstituted $(C_1$-$C_{18})$alkyl, F_3C-, FCH_2O-, F_2HCO-, F_3CO-, R_3Si-, R_3Ge-, RO-, RS-, RS(O)-, $RS(O)_2$-, R_2P-, R_2N-, R_2C=N-, NC-, RC(O)O-, ROC(O)-, RC(O)N(R)-, or $R_2NC(O)$-, or two of the R^S are taken together to form an unsubstituted $(C_1$-$C_{18})$alkylene, wherein each R independently is an unsubstituted $(C_1$-$C_{18})$alkyl.

2. The procatalyst according to Claim 1 wherein Z is O.

3. A catalyst system comprising the reaction product of:
one or more procatalysts of Claim 1 or 2; and
one or more cocatalysts; wherein the ratio of total number of moles of the one or more metal-ligand complexes of formula (I) to total number of moles of the one or more cocatalysts is from 1:10,000 to 100:1.

4. A polymerization process comprising the steps of:
polymerizing one or more α-olefins in the presence of one or more catalyst systems of Claim 3 under olefin polymerizing conditions; and thereby forming an olefin based polymer.