

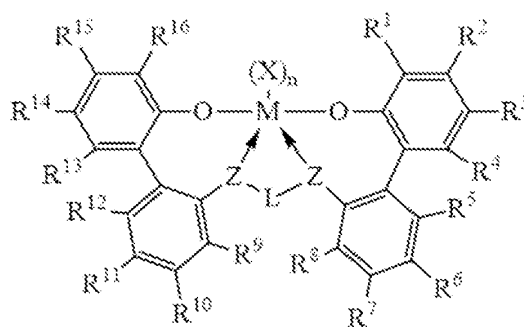
CLAIMS

1. A process comprising:

contacting, under polymerization conditions, one or more C₆-C₁₄ α-olefin monomers with a bis-biphenylphenoxy catalyst; and

forming a polymer composed of one or more C₆-C₁₄ α-olefin monomers, and having an absolute weight average molecular weight (Mw_(abs)) greater than 1,300,000 g/mol and a Mw_(abs)/Mn_(abs) from 1.3 to 3.0.
2. The process of claim 1 comprising contacting one or more C₆-C₁₄ α-olefin monomers with a bis-biphenylphenoxy catalyst having the formula

formula (I)



wherein

M is a metal selected from zirconium or hafnium, the metal being in a formal oxidation state of +2, +3, or +4;

n is an integer of from 0 to 3, and wherein when n is 0, X is absent; and

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; and

each Z independently is O, S, N(C₁-C₄₀)hydrocarbyl, or P(C₁-C₄₀)hydrocarbyl; and

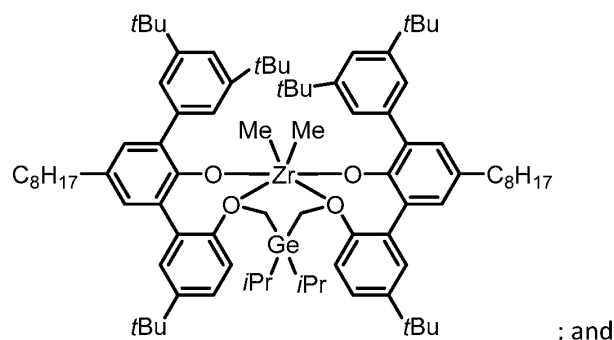
O is O (an oxygen atom);

L is (C₁-C₄₀)hydrocarbylene or (C₁-C₄₀)heterohydrocarbylene, wherein the (C₁-C₄₀)hydrocarbylene has a portion that comprises a 1-carbon atom to 10-carbon atom linker backbone linking the two Z groups in formula (I) (to which L is bonded) or the (C₁-C₄₀)heterohydrocarbylene has a portion that comprises a 1-atom to 10-atom linker backbone linking the two Z groups in formula (I), wherein each of the 1 to 10 atoms of the 1-atom to 10-atom linker backbone of the (C₁-C₄₀)heterohydrocarbylene independently is a carbon atom or heteroatom, wherein each heteroatom independently is O, S, S(O), S(O)₂, Si(R^C)₂, Ge(R^C)₂, P(R^C), or N(R^C), wherein independently each R^C is (C₁-C₃₀)hydrocarbyl or (C₁-C₃₀) heterohydrocarbyl; and

each R¹⁻¹⁶ is selected from (C₁-C₄₀)hydrocarbyl, (C₁-C₄₀)heterohydrocarbyl, Si(R^C)₃, Ge(R^C)₃, P(R^C)₂, N(R^C)₂, OR^C, SR^C, NO₂, CN, CF₃, 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 combinations thereof.

3. The process of any of claims 1-2 comprising contacting the one or more C₆-C₁₄ α-olefin monomers with a bis-biphenylphenoxy catalyst having the formula (V)

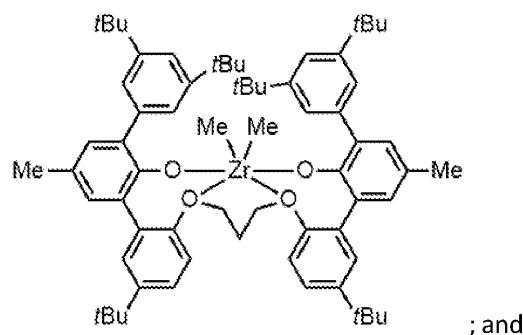
formula (V)



forming a polymer composed of one or more C₆-C₁₄ α-olefin monomers and having an absolute weight average molecular weight (Mw_(abs)) greater than 1,300,000 g/mol and a Mw_(abs)/Mn_(abs) from 1.3 to 3.0, a residual amount of zirconium, and a residual amount of germanium.

4. The process of any of claims 1-2 comprising contacting the one or more C₆-C₁₄ α -olefin monomers with a bis-biphenylphenoxy catalyst having the formula (VI)

formula (VI)



forming a polymer composed of one or more C₆-C₁₄ α -olefin monomers, and having an absolute weight average molecular weight ($Mw_{(abs)}$) greater than 1,300,000 g/mol and a $Mw_{(abs)}/Mn_{(abs)}$ from 1.3 to 3.0, and a residual amount of zirconium.

5. The process of claims 3 or 4 comprising contacting, under polymerization conditions, one or more C₆-C₈ α -olefin monomers with a bis-biphenylphenoxy catalyst having the formula (V) or the formula (VI); and

forming a polymer composed of one or more C₆-C₈ α -olefin monomers, the polymer comprising a residual amount of zirconium and having an absolute weight average molecular weight ($Mw_{(Abs)}$) greater than 1,300,000 g/mol and a $Mw_{(Abs)}/Mn_{(Abs)}$ from 1.3 to 3.0.

6. The process of claim 5 comprising contacting, under polymerization conditions, octene monomer with a bis-biphenylphenoxy catalyst having the formula (V) or the formula (VI); and

forming an octene homopolymer comprising a residual amount of zirconium and having an absolute weight average molecular weight ($Mw_{(Abs)}$) greater than 1,300,000 g/mol and a $Mw_{(Abs)}/Mn_{(Abs)}$ from 1.3 to 3.0.

7. The process of claim 6 comprising contacting, under polymerization conditions, octene monomer with a bis-biphenylphenoxy catalyst having the formula (V); and

forming an octene homopolymer comprising a residual amount of germanium and

having an absolute weight average molecular weight ($Mw_{(Abs)}$) greater than 1,300,000 g/mol and a $Mw_{(Abs)}/Mn_{(Abs)}$ from 1.3 to 3.0.

8. A composition comprising:
a polymer composed of one or more C₆-C₁₄ α -olefin monomers, the polymer comprising a residual amount of zirconium, the polymer having an absolute weight average molecular weight ($Mw_{(Abs)}$) greater than 1,300,000 g/mol and a $Mw_{(Abs)}/Mn_{(Abs)}$ from 1.3 to 3.0.
9. The composition of claim 8 wherein the polymer comprises from 0 ppm to less than 10 ppm titanium.
10. The composition of any of claims 8-9 wherein the polymer comprises from greater than 0 ppm to 300 ppm zirconium.
11. The composition of any of claims 8-10 wherein the polymer comprises from greater than 0 ppm to 300 ppm germanium.
12. The composition of any of claims 8-11 wherein the polymer is selected from the group consisting of octene homopolymer and hexene homopolymer.