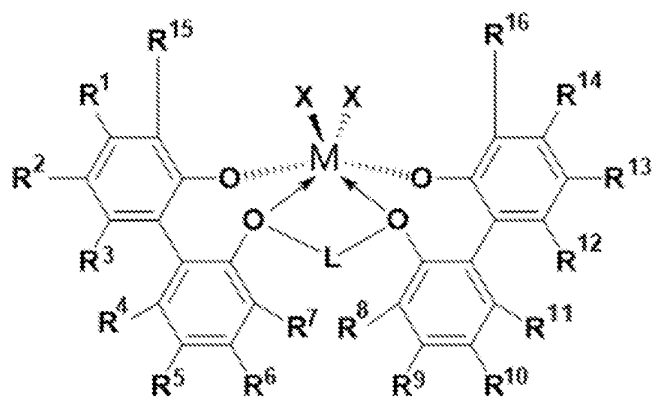


What is claimed is:

1. A bimodal polymerization catalyst system comprising:
a metallocene olefin polymerization catalyst; and
a biphenylphenol polymerization catalyst made from a biphenylphenol polymerization precatalyst of Formula I:



(Formula I)

- wherein each of R^7 and R^8 is independently a C_1 to C_{20} alkyl, aryl or aralkyl, halogen, or a hydrogen;
- wherein each of R^5 and R^{10} is independently a C_1 to C_{20} alkyl, aryl, aralkyl, halogen, an alkyl-or aryl-substituted silyl, or a hydrogen;
- wherein each of R^2 and R^{13} is independently a C_1 to C_{20} alkyl, aryl or aralkyl or a hydrogen;
- wherein each of R^{15} and R^{16} is independently a 2,7-disubstituted carbazol-9-yl;
- wherein L is a saturated C_2 - C_3 alkyl that forms a 2-carbon bridge or 3-carbon bridge between the two oxygen atoms to which L is bonded;
- wherein each X is independently halogen, a hydrogen, a $(C_1$ - $C_{20})$ alkyl, a $(C_7$ - $C_{20})$ aralkyl, a $(C_1$ - $C_6)$ alkyl-substituted $(C_6$ - $C_{12})$ aryl, or a $(C_1$ - $C_6)$ alkyl-substituted benzyl, $-CH_2Si(R^C)_3$, where R^C is C_1 - C_{12} hydrocarbon;
- wherein each of R^1 , R^3 , R^4 , R^6 , R^9 , R^{11} , R^{12} , and R^{14} is independently a hydrogen;
- and
- wherein M is a heteroatom selected from a group consisting of Zr and Hf.

2. The bimodal polymerization catalyst system of claim 1, wherein each of R^7 and R^8 is a C_1 alkyl.

3. The bimodal polymerization catalyst system of claim 1 or 2, wherein each of R^5 and R^{10} is a di-alkyl or tri-alkyl substituted silyl.
4. The bimodal polymerization catalyst system of any one of claims 1-3, wherein each R^2 and R^{13} is a 1,1,3,3-tetramethylbutyl.
5. The bimodal polymerization catalyst system of any one of claims 1-4, wherein each of R^{15} and R^{16} is a 2,7-di-*t*-butylcarbazol-9-yl.
6. The bimodal polymerization catalyst system of any one of claims 1-5, wherein L is a saturated C_3 alkyl.
7. The bimodal polymerization catalyst system of any one of claims 1-6, wherein each X is a C_1 alkyl.
8. The bimodal polymerization catalyst system of any one of claims 1-7, wherein M is Zr.
9. The bimodal polymerization catalyst system of any one of claims 1-7, wherein M is Hf.
10. The bimodal polymerization catalyst system of any one of claims 1-9, wherein the metallocene olefin polymerization catalyst is made from a metallocene precatalyst selected from the group consisting of:
 - (pentamethylcyclopentadienyl)(propylcyclopentadienyl) MX_2 ,
 - (tetramethylcyclopentadienyl)(propylcyclopentadienyl) MX_2 ,
 - (tetramethylcyclopentadienyl)(butylcyclopentadienyl) MX_2 ,
 - (methylcyclopentadienyl)(1,3-dimethyl-tetrahydroindenyl) MX_2 ,
 - (cyclopentadienyl)(1,3-dimethyl-tetrahydroindenyl) MX_2 ,
 - (cyclopentadienyl)(4,7-dimethylindenyl) MX_2 ,
 - (cyclopentadienyl)(1,5-dimethylindenyl) MX_2 ,
 - (cyclopentadienyl)(1,4-dimethylindenyl) MX_2 ,
 - $Me_2Si(indenyl)_2MX_2$,

$\text{Me}_2\text{Si}(\text{tetrahydroindenyl})_2\text{MX}_2$,
 $(n\text{-propyl cyclopentadienyl})_2\text{MX}_2$,
 $(n\text{-butyl cyclopentadienyl})_2\text{MX}_2$,
 $(1\text{-methyl, 3-butyl cyclopentadienyl})_2\text{MX}_2$,
 $\text{HN}(\text{CH}_2\text{CH}_2\text{N}(2,4,6\text{-Me}_3\text{phenyl}))_2\text{MX}_2$,
 $\text{HN}(\text{CH}_2\text{CH}_2\text{N}(2,3,4,5,6\text{-Me}_5\text{phenyl}))_2\text{MX}_2$,
 $(\text{butyl cyclopentadienyl})_2\text{MX}_2$,
 $(\text{propyl cyclopentadienyl})_2\text{MX}_2$, and mixtures thereof,

wherein M is Zr or Hf, and X is selected from F, Cl, Br, I, Me, benzyl,
 CH_2SiMe_3 , and C_1 to C_5 alkyls or alkenyls.

11. The bimodal polymerization catalyst system of any one of claims 1-10, further comprising a silica support, which supports: (a) the metallocene olefin polymerization catalyst but not the biphenylphenol polymerization catalyst made from biphenylphenol polymerization precatalyst of Formula I, (b) the biphenylphenol polymerization catalyst made from the biphenylphenol polymerization precatalyst of Formula I, but not the metallocene olefin polymerization catalyst, or (c) a combination the metallocene olefin polymerization catalyst and the biphenylphenol polymerization catalyst made from a biphenylphenol polymerization precatalyst of Formula I.

12. A method of making a bimodal polyethylene composition comprising a high molecular weight polyethylene component and a low molecular weight polyethylene component, wherein the high and low molecular weight polyethylene components are made together in a single gas-phase reactor via a polymerization process employing the bimodal polymerization catalyst system of claim 1, wherein the bimodal polyethylene composition has a value of the weight average molecular weight (Mw) to number average molecular weight (Mn) ratio (Mw/Mn) that is greater than 5.00; a value of an z-average molecular weight (Mz) to weight average molecular weight (Mw) ratio (Mz/Mw) that is less than the Mw/Mn; or both the Mw/Mn greater than 5.00 and a Mz/Mw less than the Mw/Mn.

13. The method of claim 12, further comprising:
 forming a trim solution including at least the metallocene olefin polymerization catalyst, the biphenylphenol polymerization precatalyst of Formula I, or the biphenylphenol

polymerization catalyst made from the biphenylphenol polymerization precatalyst of Formula I; and

adding the trim solution to the single reactor to make at least a part of the bimodal polymerization catalyst system.

14. A method of making the bimodal polymerization catalyst system of any one of claims 1 to 11, the method comprising making the biphenylphenol polymerization catalyst by contacting, under activating conditions, the biphenylphenol polymerization precatalyst of Formula I with an activator.

15. The method of claim 14, wherein the activator is spray-dried on a silica support and the method comprises making the biphenylphenol polymerization catalyst by contacting, under activating conditions, the biphenylphenol polymerization precatalyst of Formula I with the supported spray-dried activator.