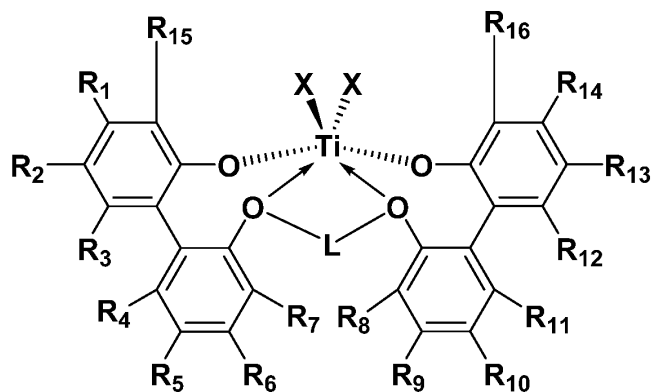


What is claimed is:

1. A titanium biphenylphenol polymerization precatalyst of Formula I:



(Formula I)

wherein each of R⁷ and R⁸ is independently a C₁ to C₂₀ alkyl, aryl, aralkyl or a hydrogen;

wherein each of R⁵ and R¹⁰ is independently a C₁ to C₂₀ alkyl, aryl, aralkyl, halide, or a hydrogen;

wherein each of R² and R¹³ is independently a C₁ to C₂₀ alkyl, aryl, aralkyl or a hydrogen;

wherein each of R¹⁵ and R¹⁶ is a 2,7-disubstituted carbazole or a 3,6-disubstituted carbazole;

wherein L is a C₂-C₄ alkylene that forms a 2-carbon bridge, 3-carbon bridge, or a 4-carbon bridge respectively, between the two oxygen atoms to which L is covalently bonded;

wherein each of R¹, R³, R⁴, R⁶, R⁹, R¹¹, R¹², and R¹⁴ is independently a halide or a hydrogen; and

wherein each X is independently a hydrocarbyl, halide, pseudohalide, hydroxy group, alkoxy group, phenoxy group, aryloxy group, or a hydrogen and at least one X is not a hydrocarbyl.

2. The precatalyst of claim 1, wherein each of R⁷ and R⁸ is a C₁ alkyl or each of R⁷ and R⁸ is a hydrogen.

3. The precatalyst of claim 1 or 2, wherein each of R⁵ and R¹⁰ is a di-alkyl or tri-alkyl substituted silyl.

4. The precatalyst of claim 3, wherein each of R⁵ and R¹⁰ is an octyl dimethyl silyl.
5. The precatalyst of claim 1 or 2, wherein each of R⁵ and R¹⁰ is flourine.
6. The precatalyst any one of claims 1-5, wherein each of R² and R¹³ is a 1,1-dimethylethyl.
7. The precatalyst of any one of claims 1-6, wherein each of R¹⁵ and R¹⁶ is a 2,7-di-t-butlycarbazole or a 3,6-di-t-butlycarbazole.
8. The precatalyst of any one of claims 1-7, wherein L is a saturated C₃ alkylene.
9. The precatalyst of any one of claims 1-8, wherein each X is chlorine.
10. The precatalyst of any one of claims 1-9, further comprising a silica support that is free of activator, wherein the activator-free silica support supports the precatalyst.
11. A method of making a titanium biphenylphenol polymerization catalyst, the method comprising contacting, under activating conditions, a titanium biphenylphenol polymerization precatalyst of Formula I of any one of claims 1 to 10 with an activator so as to activate the titanium biphenylphenol polymerization precatalyst of Formula I, thereby making the titanium biphenylphenol polymerization catalyst.
12. The method of claim 11, further comprising:
contacting an activator-free solution of the titanium biphenylphenol polymerization precatalyst of Formula I dissolved in an alkane solvent with a silica support containing thereon a spray-dried activator to make the titanium biphenylphenol polymerization catalyst on a silica support.
13. A titanium biphenylphenol polymerization catalyst made by the method of claim 11 or 12.

14. A method of making a polyethylene, the method comprising:
polymerizing an olefin monomer in a single gas-phase polymerization reactor in presence of the titanium biphenylphenol polymerization catalyst of claim 13 to make a polyethylene composition.
15. The method of claim 14, before the polymerizing step, further comprising:
making the titanium biphenylphenol polymerization catalyst; and
feeding the titanium biphenylphenol polymerization catalyst into the single gas-phase polymerization reactor.