Claims:

We claim:

1. A method comprising:

contacting in an aliphatic solvent at a temperature of from less than -10°C to -60°C a support material having absorbed water and at least one hydrocarbyl aluminum compound; wherein

the support material contains absorbed water in a ratio of from 1:1.5 to 1:3 mol water : mol hydrocarbyl aluminum; and

the supported alumoxane composition is further heat-treated at a temperature from 60°C to 200°C for 0.5 to 24 hours.

2. The method of claim 1, wherein the temperature of the contacting is -60°C to -20°C.

3. The method of claim 1, wherein the aliphatic solvent is one or more of isopentane, hexane, n-heptane, octane, nonane, decane, cyclopentane, methylcyclopentane, cyclohexane, and methylcyclohexane or mixtures thereof.

4. The method of claim 1, wherein the amount of hydrocarbyl aluminum compound on the support material is from 1.0 mmol aluminum per gram of support material to 30 mmol aluminum per gram of support material.

5. The method of claim 1, wherein the support material comprises a solid oxide optionally treated with an electron-withdrawing anion, wherein the solid oxide is selected from silica, alumina, silica-alumina, silica-zirconia, alumina-zirconia, aluminum phosphate, heteropolytungstates, titania, magnesia, boria, zinc oxide, mixed oxides thereof, or mixtures thereof; and the optional electron-withdrawing anion is selected from fluoride, chloride, bromide, phosphate, triflate, bisulfate, sulfate, and any combination thereof.

6. The method of claim 1, wherein the hydrocarbyl aluminum compound is one or more of trimethylaluminum, triethylaluminum, tripropylalumiuum, tri-n-

butylaluminum, tri-isobutyl-aluminum, tri(2-methylpentyl)aluminum, trihexylaluminum, tri-n-octylaluminum, and tri-n-decylaluminum.

7. The method of claim 1, wherein the hydrocarbyl aluminum compound is one or more of trimethylaluminum and tri-n-octylaluminum.

8. The method of claim 1, wherein the support material is silica and the hydrocarbyl aluminum compound is trimethylaluminum.

9. The method of claim 1, further comprising, after the heating step, contacting the supported alumoxane with at least one catalyst compound having a Group 3 through Group 12 transition metal atom or lanthanide metal atom.

10. The method of claim 9, wherein the catalyst compound is a metallocene catalyst compound comprising a Group 4 metal.

11. The method of claim 9, wherein the catalyst compound is a metallocene catalyst compound selected from the group consisting of:
bis(1-methyl, 3-n-butyl cyclopentadienyl) zirconium dichloride;
bis(1-methyl, 3-n-butyl cyclopentadienyl) zirconium dimethyl;
dimethylsilyl bis(tetrahydroindenyl) zirconium dichloride;
dimethylsilyl bis(tetrahydroindenyl) zirconium dimethyl;
bis(n-propylcyclopentadienyl) hafnium dichloride;
bis(n-propylcyclopentadienyl) hafnium dimethyl;
dimethylsilyl (tetramethylcyclopentadienyl)(cyclododecylamido)titanium dimethyl;
dimethylsilyl (tetramethylcyclopentadienyl)(cyclododecylamido)titanium dichloride;
dimethylsilyl (tetramethylcyclopentadienyl)(t-butylamido)titanium dimethyl;
dimethylsilyl (tetramethylcyclopentadienyl)(t-butylamido)titanium dichloride;
μ-$(CH_3)_2$Si(cyclopentadienyl)(l-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$(R)_2$;
where M is Ti, Zr, or Hf; and R is halogen or C_1 to C_5 alkyl.

12. The method of claim 1, wherein the support material having absorbed water is added as a solid form.

13. The process of claim 1, wherein the hydrocarbyl aluminum aliphatic solution concentration is 0.1 to 40 wt%.

14. The process of claim 1, wherein the hydrocarbyl aluminum aliphatic solution concentration is 1.0 to 20 wt%.

15. The process of claim 1, wherein the process is a batch process or a continuous process.

16. The process of claim 1, wherein the process is continuous and comprises isolating the supported aluminoxane, in solid form after the heating step, and recycling any excess hydrocarbyl aluminum.

17. The method of claim 1, wherein the aliphatic solution is one or more of non-cyclic alkanes and cycloalkanes.

18. The method of claim 1, wherein the aliphatic solution is one or more of non-cyclic alkanes with formula $C_nH_{(2n+2)}$ where n is 4 to 30, cycloalkanes with formula C_nH_{2n} where n is 5 to 30 and mixtures thereof.

19. A continuous process for preparing supported alumoxane comprising contacting in an aliphatic solvent at a temperature of from less than -10°C to -60°C at least one support material comprising silica having absorbed water and at least one hydrocarbyl aluminum compound to produce a silica supported alumoxane, separating the silica

supported alumoxane from the aliphatic solvent and recycling the aliphatic solvent and any excess hydrocarbyl aluminum; wherein

the at least one support material contains absorbed water in a ratio of from 1:1.5 to 1:3 mol water : mol hydrocarbyl aluminum; and

the supported alumoxane composition is further heat-treated at a temperature from 60°C to 200°C for 0.5 to 24 hours.