Claims:

We claim:

1. A method comprising:

forming a slurry of at least one support material having absorbed water in an amount of 2 to 12 mmol of water per one gram of support material with an aliphatic solvent and allowing to agitate at an ambient temperature for 2 to 24 hours;

cooling a 1-50 wt% hydrocarbyl aluminum aliphatic solution to -5 °C to -60 °C, wherein a ratio of the hydrocarbyl aluminum to the absorbed water on the support is in a ratio of 1.3:1 (mol:mol) or higher, provided that for 4-8 mmol water/g support material the hydrocarbyl aluminum is cooled to -8 °C or lower, and for 8-12 mmol water/g support material the hydrocarbyl aluminum is cooled to a -18 °C or lower;

adding the slurry to the hydrocarbyl aluminum having been cooled and forming a supported alumoxane slurry with no detectable aromatic hydrocarbon solvent, wherein a rate of the adding is controlled so that heat generated does not increase a set reaction temperature by more than 2 °C, and forming at least a portion of a pre-MAO that is partially soluble in the aliphatic solvent; and

heating the supported alumoxane slurry with no detectable aromatic hydrocarbon solvent to at least 60°C up to 140 °C such that an amount of said pre-MAO is decreased or becomes undetectable and a soluble portion extracted from the heated supported alumoxane slurry with THF shows NMR detectable $AlMe_2(THF)_2^+$ species when THF-d8 is used as the NMR solvent.

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

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