CLAIMS

We claim:

1. A method comprising:

preparing an alumoxane precursor from an organic oxygen source, a hydrocarbyl aluminum, and an organic solvent, wherein the organic oxygen source is methacrylic acid, the hydrocarbyl aluminum is trimethylaluminum, and the organic solvent is toluene; and

heating the alumoxane precursor to form an alumoxane suspension wherein the alumoxane is heated at a temperature of from 95ºC to 115ºC;

removing solid methylaluminoxane from the alumoxane suspension by filtering the alumoxane suspension to form a filtered solution; and

combining the filtered solution with a support to form a supported alumoxane precursor.

2. The method of claim 1, wherein the filtering the alumoxane solution comprises filtering the solid methylaluminoxane having one or more of the following properties:

a particle size distribution of from 30 μm to 45 μm (<10%), from 50 μm to 70 μm (<25%), from 110 μm to 140 μm (<50%), from 390 μm to 420 μm (<75%), or from 820 μm to 840 μm (<90%);

a BET Surface area of from 10 m^2/g to 80 m^2/g; and/or

a pore volume of from 0.01 mL/g to 0.2 mL/g (BJH adsorption cumulative between 17 Å and 3000 Å).

3. The method of any preceding claim, further comprising drying the supported alumoxane precursor to form a supported alumoxane.

4. The method of any preceding claim, wherein a molar ratio of the organic oxygen source to the hydrocarbyl aluminum in the alumoxane precursor is from 4:5 to 1:5.

5. The method of any preceding claim, wherein preparing an alumoxane precursor comprises:

introducing the hydrocarbyl aluminum to the organic solvent to form a hydrocarbyl aluminum solvent mixture;

introducing the organic oxygen source to the organic solvent to form an organic oxygen solvent mixture; and

adding the organic oxygen solvent mixture to the hydrocarbyl aluminum solvent mixture to form the alumoxane precursor.

6. The method of any preceding claim, further comprising cooling the alumoxane suspension at less than 30°C before the filtering of the alumoxane suspension.

7. The method of any preceding claim, further comprising:

generating a supported methylaluminoxane from the supported alumoxane precursor; and

generating a catalyst system by introducing one or more catalyst compounds to the supported methylaluminoxane.

8. The method of claim 7, wherein the catalyst compound comprises a metallocene.

9. The method of claim 7, wherein the catalyst compound comprises a non-metallocene.

10. The method of claim 7, further comprising generating a polymer from the catalyst system.