CLAIMS

What is claimed is:

1. A polymerization catalyst for forming a polyethylene copolymer, comprising:

a catalyst support;

a blend of at least two catalysts selected by:

generating a plurality of polymers for the at least two catalysts, wherein each polymer is generated at a different hydrogen to ethylene ratio, wherein one of the at least two catalysts generates a polymer with a higher weight

average molecular weight (hmw) and another of the at least two catalysts generates a polymer with a lower weight average molecular weight (lmw), wherein the ratio of hmw to lmw is greater than about 5.0 at a weight average molecular weight of between about 30,000 and about 150,000;

measuring the molecular weight for each polymer;

determining the relationship between the molecular weight of the polymers generated by each of the at least two catalysts and the ratio of hydrogen to ethylene;

generating a family of bPDI curves for polymers that would be made using a plurality of ratios of a blend of the at least two catalysts for each of a plurality of ratios of hydrogen to ethylene; and

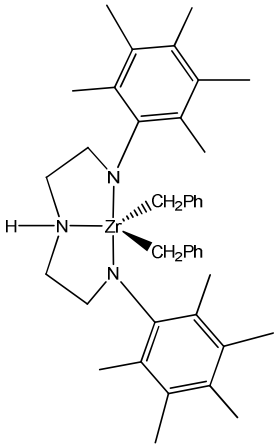
selecting a ratio for the catalyst blend of the at least two catalysts that generates a polymer having a bPDI that matches a polymer fabrication process.

2. The system of claim 1, wherein a catalyst impregnated on the catalyst support is bis(n-propylcyclopentadienyl) hafnium $(CH_3)_2$, bis(n-propylcyclopentadienyl) hafnium F_2, bis(n-propylcyclopentadienyl) hafnium Cl_2, or any combinations thereof.

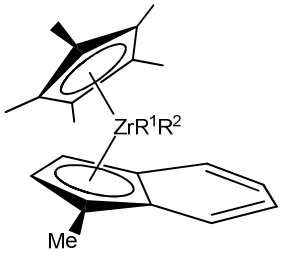
3. The system of claim 1, wherein a catalyst impregnated on the catalyst support is bis(n-butyl, methyl cyclopentadienyl) zirconium $(CH_3)_2$, bis(n-butyl, methyl cyclopentadienyl) zirconium Cl_2, bis(n-butyl, methyl cyclopentadienyl) zirconium F_2, or any combinations thereof.

4. The system of claim 1, wherein a catalyst impregnated on the catalyst support is bis(1-ethylindenyl) zirconium $(CH_3)_2$, bis(1-ethylindenyl) zirconium F_2, bis(1-ethylindenyl) zirconium Cl_2, or any combinations thereof.

5. The system of claim 1, wherein a catalyst impregnated on the catalyst support is represented by the formula:



6. The system of claim 1, wherein a catalyst impregnated on the catalyst support is any one, or any combination, of the compounds represented by the following formulas:



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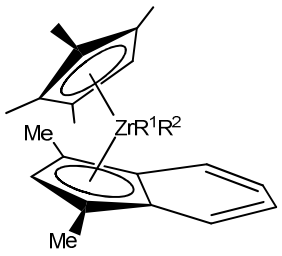

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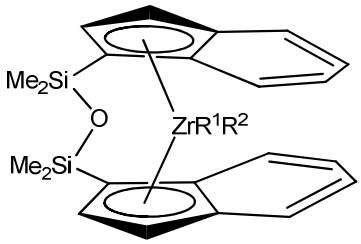
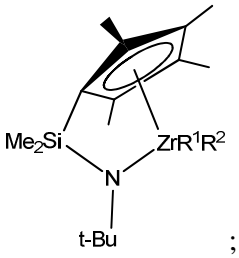


, or


; wherein R^1 and R^2 are each, independently, methyl, chloro, fluoro, or a hydrocarbyl group.