SUMMARY

[0004] Disclosed herein is an example method of producing a polyolefin comprising contacting a reaction mixture and a reduced chromium oxide catalyst in a gas-phase reactor to produce the polyolefin, wherein the reaction mixture comprises a monomer and a co-monomer; and changing a reaction temperature in the gas-phase reactor by about 1° C or more whereby a gas molar ratio of the co-monomer to the monomer is changed by about 2% or more and a co-monomer content of the polyolefin at substantially constant density is changed by about 2% or more.

[0004a] In one aspect, there is provided a method of producing a polyolefin comprising:

contacting a reaction mixture and a reduced chromium oxide catalyst in a gas-phase reactor to produce the polyolefin, wherein the reaction mixture comprises a monomer and a co-monomer; and

decreasing a reaction temperature in the gas-phase reactor by 2° C or more to increase a gas molar ratio of the co-monomer to the monomer by 2% or more and to increase a co-monomer content of the polyolefin at substantially constant density by 2% or more, wherein a concentration of oxygen in the gas-phrase reactor is not adjusted in decreasing the reaction temperature.

[0005] Also disclosed herein in an example method of producing a polyolefin comprising contacting a reaction mixture and a reduced chromium oxide catalyst in a gas-phase reactor to produce the polyolefin, wherein the reaction mixture comprises ethylene and a co-monomer, and wherein the polyolefin is characterized by (i) a modified-Charpy impact strength of about 20 kJ/m^2 or more and (ii) an ESCR of about 50 hours or more as determined by notched constant ligament stress (nCLS).

[0006] Also disclosed herein is a composition comprising a reduced chromium oxide-catalyzed polyolefin, wherein the reduced chromium oxide-catalyzed polyolefin is characterized by (i) a modified-Charpy impact strength of about 22 kJ/m^2 or more and (ii) an equivalent stress cracking resistance of about 30 hours or more as determined by determined by nCLS.

[0007] Also disclosed herein is a composition comprising a reduced chromium oxide-catalyzed polyolefin, wherein the reduced chromium oxide-catalyzed polyolefin is characterized by (i) a modified-Charpy impact strength of about 20 kJ/m^2 or more and (ii) an equivalent stress cracking resistance of about 50 hours or more determined by nCLS.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The drawing illustrates certain aspects of the disclosed embodiments and should not be used to limit or define the invention.

CLAIMS

What is claimed is:

1. A method of producing a polyolefin comprising:
   contacting a reaction mixture and a reduced chromium oxide catalyst in a gas-phase reactor to produce the polyolefin, wherein the reaction mixture comprises a monomer and a co-monomer; and
   decreasing a reaction temperature in the gas-phase reactor by 2° C or more to increase a gas molar ratio of the co-monomer to the monomer by 2% or more and to increase a co-monomer content of the polyolefin at substantially constant density by 2% or more, wherein a concentration of oxygen in the gas-phrase reactor is not adjusted in decreasing the reaction temperature.

2. The method of claim 1 wherein the reduced chromium oxide catalyst has been reduced with an alkyl aluminum alkoxide.

3. The method of claim 1 wherein the monomer comprises ethylene.

4. The method of claim 1 wherein the co-monomer comprises an alpha olefin comprising from 3 carbons to 20 carbons.

5. The method of claim 1 wherein the reaction temperature in the gas-phase reactor is decreased by 5°C or more.

6. The method of claim 1 wherein the comonomer content of the polyolefin at substantially constant density is increased by 5% or more.

7. The method of claim 1 wherein the comonomer content of the polyolefin at substantially constant density is increased by 25% or more.