CLAIMS

We claim:

1. A process comprising:

introducing a catalyst solution, via a first line, into a reactor, the catalyst solution comprising a catalyst and a first non-aromatic diluent;

introducing an activator solution, via a second line, into the reactor, the activator solution comprising an activator and a second non-aromatic diluent, wherein the second non-aromatic diluent is the same as the first non-aromatic diluent;

operating the reactor under process conditions, wherein the process conditions comprise a temperature delta of about 0 ºC to about 20 ºC during a substantial entirety of the process; and

obtaining an effluent from the reactor, the effluent comprising a polyolefin,

wherein the first line and the second line are coupled with the reactor.

2. The process of claim 1, wherein the catalyst solution is free of the activator.

3. The process of claim 1, wherein the activator solution is free of the catalyst.

4. The process of claim 1, wherein the catalyst solution consists of the catalyst and the non-aromatic diluent.

5. The process of claim 1, wherein the activator solution consists of the activator and the non-aromatic diluent.

6. The process of claim 1, wherein the first non-aromatic diluent and the second non-aromatic diluent are selected from the group consisting of 2-methyl-pentane, isobutane, butane, n-pentane, isopentane, hexanes, isohexane, heptane, octane, dodecane, and mixture(s) thereof.

7. The process of claim 1, wherein the process conditions comprise the temperature delta of about 0 ºC to about 10 ºC during the substantial entirety of the process.

8. The process of claim 1, wherein the first non-aromatic diluent and the second non-aromatic diluent have about 1 wt% or less aromatics, based on the weight of first non-aromatic diluent + aromatics and the second non-aromatic diluent, respectively.

9. The process of claim 1, wherein the process conditions comprise the temperature delta of about 0.5 ºC to about 5 ºC during the substantial entirety of the process.

10. The process of claim 1, wherein the activator solution comprises the activator in an amount of about 0.01 wt% to about 20 wt%, based on the weight of the activator solution.

11. The process of claim 10, wherein the activator solution comprises the activator in an amount of about 0.15 wt% to about 0.3 wt%, based on the weight of the activator solution.

12. The process of claim 1, wherein introducing the activator solution to the reactor is performed at a feed rate of:

about 0.01 kg/hr to about 40 kg/hr, or

about 0.02 L/hr to about 60 L/hr.

13. The process of claim 1, wherein the catalyst solution comprises the catalyst in an amount of about 0.01 wt% to about 20 wt%, based on the weight of the catalyst solution.

14. The process of claim 13, wherein the catalyst solution comprises the catalyst in an amount of about 0.05 wt% to about 0.1 wt%, based on the weight of the catalyst solution.

15. The process of claim 1, wherein introducing the catalyst solution to the reactor is performed at a feed rate of:

about 0.003 kg/hr to about 40 kg/hr, or

about 0.004 L/hr to about 60 L/hr.

16. The process of claim 1, wherein the process conditions comprise the temperature delta of about 1 ºC to about 3 ºC during the substantial entirety of the process.

17. The process of claim 1, wherein the effluent has an aromatic content of about 1 wt% or less, based on the weight of the effluent.

18. The process of claim 1, wherein the polyolefin has an aromatic content of about 1 wt% or less, based on the weight of the polyolefin.

19. The process of claim 1, wherein:

the process conditions comprise a temperature of about 130 ºC to about 200 ºC and a pressure of about 100 bar to about 130 bar, and

the polyolefin is a plastomer.

20. The process of claim 1, wherein the activator is represented by Formula (**AI**):

$$[R^1R^2R^3EH]_d^+[M^{k+}Q_n]^{d-} \qquad \textbf{(AI)}$$

wherein:

E is nitrogen or phosphorous;

each d is the same and is 1, 2 or 3;

k is 1, 2, or 3;

n is 1, 2, 3, 4, 5, or 6;

n - k = d;

each of R^1, R^2, and R^3 is independently selected from the group consisting of H, C_1-C_{40} alkyl, and C_5-C_{50}-aryl; wherein R^1, R^2, and R^3 together comprise 15 or more carbon atoms;

M is an element selected from group 13 of the Periodic Table of the Elements; and

each Q is independently selected from the group consisting of hydrogen, bridged or unbridged dialkylamido, halide, alkoxide, aryloxide, hydrocarbyl, halocarbyl.