CLAIMS

1. A process for polymerization comprising:

(i) providing a polyolefin product stream, wherein the polyolefin product stream comprises polyolefin product and unreacted monomer;

(ii) quenching the polyolefin product stream with a quenching agent selected from water, a C_1 to C_8 alcohol, and mixtures thereof, to produce a quenched polyolefin stream,

(iii) separating the quenched polyolefin stream into polyolefin product and a recycle stream; and

(iv) contacting at least a portion of the recycle stream with an adsorbent bed to produce a treated recycle stream, wherein the recycle stream comprises quenching agent, one or more C_6 to C_{12} conjugated or non-conjugated diene monomers, and one or more C_1 to C_{40} oxygenates, and wherein the adsorbent bed comprises at least two adsorbents to remove the quenching agent and/or the C_1 to C_{40} oxygenates.

2. The process of claim 1, wherein the adsorbent bed comprises at least one adsorbent to remove water and at least one other adsorbent to remove C_8 to C_{40} oxygenates.

3. The process of claim 1 ~~or 2~~, wherein at least one adsorbent is a zeolitic molecular sieve and at least one adsorbent is a hybrid zeolite in alumina.

4. The process of claim 3, wherein the hybrid zeolite in alumina adsorbent removes C_8 to C_{40} oxygenates.

5. The process of claim 3 ~~or 4~~, wherein the adsorbent ~~bend~~ bed further comprises an alumina adsorbent.

6. The process of ~~any one of claims 3-5~~ claim 3, wherein the adsorbent ~~bend~~ bed further comprises at least one silica adsorbent.

7. The process of ~~any one of claims 3-6~~ claim 3, wherein the zeolitic molecular

sieve comprises material selected from the group consisting of zeolite X, zeolite Y, zeolite A, faujasite, mordenite, ferrierite, and mixtures thereof.

8. The process of ~~any one of claims 3-7~~ claim 3, wherein the zeolitic molecular sieve is binderless.

9. The process of ~~any one of claims 1-8~~ claim 1, wherein the one or more C_6 to C_{12} non-conjugated diene monomers are selected from the group consisting of: 2-methyl-1,4-pentadiene, 3-methyl-1,4-pentadiene, 1,4-hexadiene, 1,5-hexadiene, 2-methyl-1,5-hexadiene 3-methyl-1,4-hexadiene, 4-methyl-1,4-hexadiene, 5-methyl-1,4-hexadiene, 1,5-heptadiene, 1,6-heptadiene, norbornadiene, 3,3-dimethyl-1,3-hexadiene, 4-ethyl-1,4-hexadiene, 5-methyl-1,4-heptadiene, 6-methyl-1,4-heptadiene, 1-vinylcyclohexene, 5-methylene-2-norbornene, 1,6-octadiene, 1,7-octadiene, 1,9-octadiene, 1,7-nondiene, 1,8-nonadiene, 5-vinyl-2-norbornene, 5-ethylidene-2-norbornene, 5-ethyl-1,4-heptadiene, 5-ethyl-1,5-heptadiene, 4-methyl-1,4-octadiene, 5-methyl-1,4-octadiene, 5-methyl-1,5-octadiene, 6-methyl-1,5-octadiene, 6-methyl-1,6-octadiene, 7-methyl-1,6-octadiene, 1,8-decadiene, 1,9-decadiene, 1,4-divinylcyclohexane, 1,3-divinylcyclohexane, dicyclopentadiene, 3,7-dimethyl-1,6-octadiene, 5,7-dimethyl-1,6-octadiene, 4-ethyl-1,4-octadiene, 5-ethyl-1,4-octadiene, 5-ethyl-1,5-octadiene, 6-ethyl-1,5-octadiene, 6-ethyl-1,6-octadiene, 4-methyl-1,4-nonadiene, 5-methyl-1,4-nonadiene, 5-methyl-1,5-nonadiene, 6-methyl-1,5-nonadiene, 6-methyl-1,6-nonadiene, 7-methyl-1,6-nonadiene, 7-methyl-1,7-nonadiene, 5-allyl-2-norbornene, 1,10-undecadiene, 6-propyl-1,6-octadiene, 4-ethyl-1,4-nonadiene, 5-ethyl-1,4-nonadiene, 5-ethyl-1,5-nonadiene, 6-ethyl-1,5-nonadiene, 6-ethyl-1,6-nonadiene, 7-ethyl-1,6-nonadiene, 5-methyl-1,4-decadiene, 5-methyl-1,5-decadiene, 6-methyl-1,5-decadiene, 6-methyl-1,6-decadiene, 7-methyl-1,6-decadiene, 7-methyl-1,7-decadiene, 8-methyl-1,7-decadiene, 8-methyl-1,8-decadiene, 9-methyl-1,8-decadiene, 1,11-dodecadiene, 6-butyl-1,6-octadiene, 5-ethyl-1,4-decadiene, 5-ethyl-1,5-decadiene, 6-ethyl-1,5-decadiene, 6-ethyl-1,6-decadiene, 7-ethyl-1,6-decadiene, 7-ethyl-1,7-decadiene, 8-ethyl-1,7-decadiene, 8-ethyl-1,8-decadiene, 6-methyl-1,6-undecadiene, 8-methyl-1,6-undecadiene, and

combinations thereof.

10. The process of ~~any one of claims 1-9~~ claim 1, wherein the recycle stream comprises one or more of C_9 and C_{18} oxygenates, before contact with the adsorbent bed.

11. The process of ~~any one of claims 1-10~~ claim 1, wherein the recycle stream has 50 wt% more C_4 to C_{40} oxygenates than the treated recycle stream.

12. The process of ~~any one of claims 1-11~~ claim 11, wherein the recycle stream has 65 wt% more C_4 to C_{40} oxygenates than the treated recycle stream.

13. The process of ~~any one of claims 1-12~~ claim 1, wherein the quenching agent is water and the oxygenates are C_9 and C_{18} oxygenates.

14. The process of claim 1, wherein the quenching agent is a C_m alcohol, where m is an integer equal to the number of carbon atoms in the alcohol, and where the C_1 to C_{40} oxygenate is a C_{m+n}, where m is the m from the C_m alcohol, and where n is an integer from 6 to 32.

15. The process of ~~any one of claims 1-14~~ claim 1, wherein the recycle stream, after contact with the adsorbent bed, comprises 10 ppm or less C_4 to C_{40} oxygenates.

16. The process of ~~any one of claims 1-15~~ claim 1, further comprising regenerating the adsorbent bed by heating the adsorbent bed to a temperature in the range of from about 150 to about 290°C.

17. The process of ~~any one of claims 1-16~~ claim 1, further comprising subjecting the adsorbent bed to a hot diluent wash prior to and/or after regeneration.

18. The process of ~~any one of claims 1-17~~ claim 1, further comprising sparging the adsorbent bed with hot nitrogen prior to and/or after regeneration.

19. The process of ~~any one of claims 1-18~~ claim 1, wherein when the recycle stream is in contact with the adsorbent bed, from 70 wt% to 99 wt% of the C_{18}

oxygenates are absorbed and from 10 wt% to 45 wt% of the non-conjugated dienes are absorbed by the at least two adsorbents.

20. The process of ~~any one of claims 1-19~~ claim 1, wherein at least one of the adsorbents is a hybrid zeolite in alumina and has a surface area within the range of from 60 m^2/g to 140 m^2/g and a pore volume within the range from 0.30 ml/g to 0.54 ml/g.

21. The process of ~~any one of claims 1-20~~ claim 1, wherein the residence time of the recycle stream with the at least two adsorbents is within the range of from 5 to 20 minutes.

22. The process of ~~any one of claims 1-21~~ claim 1, wherein the residence time for the recycle stream with each of the adsorbents, individually, is within the range of from 4 to 18 minutes.

23. The process of ~~any one of claims 1-22~~ claim 1, wherein the oxygenate is the reaction product of a C_6 to C_{12} non-conjugated diene monomer, the quenching agent, and an aluminum alkyl adduct or a zeolitic molecular sieve.

24. The process of ~~any one of claims 1-23~~ claim 1, wherein the quenching agent is water and the recycle stream first contacts the at least one adsorbent provided to remove water, followed by the recycle stream having water removed contacting the at least one other adsorbent provided to remove C_8 to C_{40} oxygenates.