CLAIMS

What is claimed is:

1. A composition comprising at least 55 wt. % C_{10} mono-olefins, the C_{10} mono-olefins comprising:

i) from 11 to 45 wt. % 1-decene;

ii) at least 0.5 wt. % 2-butyl-l-hexene;

iii) at least 1 wt. % 3-propyl-l-heptene;

iv) from 0.5 to 12 wt. % wt. % 4-ethyl-l-octene;

v) at least 4 wt. % 4-penten-l-yl-cyclopentane; and

vi) from 2 to 40 wt. % 5-methyl-1-nonene.

2. The composition of claim l, wherein the C_{10} mono-olefins comprise from 12 to 42 wt. %, from 12 to 30 wt. %, from 15 to 38 wt. %, from 17 to 35 wt. %, or from 20 to 30 wt. % 1-decene; and/or

wherein the C_{10} mono-olefins comprise from 0.5 to 10 wt. %, from 0.75 to 7 wt. %, from 0.75 to 5 wt. %, from 1 to 5 wt. %, or from 1 to 4 wt. % 4-ethyl-l-octene; and/or

wherein the C_{10} mono-olefins comprise a weight ratio of 4-penten-l-yl-cyclopentane to 1-decene from 0:1:1 to 3: 1, from 0.2: 1 to 2: l, from 0.2: 1 to 1.2: l, from 0.3:1 to 1.5: 1, from 0.3:1 to 1:1, or from 0.4: 1 to 0.9:1.

3. The composition of claim 1 or 2, wherein the composition comprises:

(a) from 55 to 98 wt. %, from 70 to 95 wt. %, from 85 to 95 wt. %, from 55 to 85 wt. %, from 60 to 92 wt. %, or from 65 to 85 wt. % C_{10} mono-olefins; and

from 1 to 20 wt. %, from 2 to 18 wt. %, from 3 to 15 wt. %, from 5 to 13 wt. %, or from 7 to 13 wt. % pentylcyclopentane; and/or

(b) at least 90 wt. %, at least 95 wt. %, at least 96 wt. %, at least 97 wt. %, or at least 98 wt. % C_{10} hydrocarbons.

4. The composition of any one of claims 1-3, wherein the C_{10} mono-olefins comprise:

from 0.5 to 12 wt. %, from 0.75 to 12 wt. %, from 1 to 8 wt. %, or from 2 to 6 wt. % 2-butyl-l-hexene;

from 1 to 27 wt. %, from 3 to 25 wt. %, from 5 to 22 wt. %, or from 7 to 17 wt. % 3-propyl-1-heptene;

from 4 to 40 wt. %, from 4 to 37 wt. %, from 5 to 34 wt. %, from 7 to 30 wt. %, or from 10 to 25 wt. % 4-penten-l-yl-cyclopentane; and

from 2 to 38 wt. %, from 4 to 40 wt. %, from 4 to 33 wt. %, from 6 to 33 wt. %, or from 10 to 28 wt. % 5-methyl-l-nonene.

5. A C_{10-14} composition comprising:

(a) from 25 to 47 wt. %, from 30 to 42 wt. %, or from 33 to 39 wt. % of the composition comprising at least 55 wt. % C_{10} mono-olefins of any one of claims 1-4;

(b) from 30 to 55 wt. %, from 35 to 47 wt. %, or from 38 to 44 wt. % of a composition comprising at least 60 wt. % C_{12} mono-olefins, the C_{12} mono-olefins comprising:

i) at least 8 wt. % 1-dodecene; and

ii) at least 0.5 wt. % 6-hepten-l-yl-cyclopentane;

wherein the composition comprises heptylcyclopentane and n-dodecane at a weight ratio of heptylcyclopentane to n-dodecane from 0:3: 1 to 8: l; and

(c) from 12 to 35 wt. %, from 15 to 27 wt. %, or from 18 to 24 wt. % of a composition comprising at least 60 wt. % C_{14} mono-olefins, the C_{14} mono-olefins comprising:

i) at least 12 wt. % 1-tetradecene; and

ii) at least 0.5 wt. % 8-nonen-l-yl-cyclopentane;

wherein the composition comprises a total of from 3 to 30 wt. % of n-tetradecane and nonylcyclopentane.

6. The composition of claim 5, wherein the C_{10-14} composition comprises from 60 to 99 wt. %, from 70 to 98 wt. %, from 75 to 95 wt. %, or from 80 to 95 wt. % C_{10-14} mono-olefins; and/or

wherein the C_{10-14} composition comprises at least 90 wt. %, at least 95 wt. %, at least 96 wt. %, at least 97 wt. %, or at least 98 wt. % C_{10-14} hydrocarbons.

7. A C_{10-18} composition comprising:

(a) from 15 to 40 wt. %, from 19 to 35 wt. %, or from 22 to 30 wt. % of the composition comprising at least 55 wt. % C_{10} mono-olefins of any one of claims 1-4;

(b) from 19 to 40 wt. %, from 23 to 36 wt. %, or from 27 to 33 wt. % of a composition comprising at least 60 wt. % C_{12} mono-olefins, the C_{12} mono-olefins comprising:

i) at least 8 wt. % 1-dodecene; and

ii) at least 0.5 wt. % 6-hepten-l-yl-cyclopentane;

wherein the composition comprises heptylcyclopentane and n-dodecane at a weight ratio of heptylcyclopentane to n-dodecane from 0.3:1 to 8:l;

(c) from 7 to 25 wt. %, from 10 to 22 wt. %, or from 13 to 19 wt. % of a composition comprising at least 60 wt. % C_{14} mono-olefins, the C_{14} mono-olefins comprising:

i) at least 12 wt. % 1-tetradecene; and

ii) at least 0.5 wt. % 8-nonen-l-yl-cyclopentane;

wherein the composition comprises a total of from 3 to 30 wt. % of n-tetradecane and nonylcyclopentane; and

(d) at least 18 wt. %, at least 22 wt. %, at least 25 wt. %, from 18 to 40 wt. %, from 22 to 36 wt. %, or from 25 to 33 wt. % C_{16-18} hydrocarbons.

8. The composition of claim 7, wherein the C_{10-18} composition comprises from 60 to 99 wt. %, from 70 to 98 wt. %, from 75 to 95 wt. %, or from 80 to 95 wt. % C_{10-18} mono-olefins; and/or

wherein the C_{10-18} composition comprises at least 90 wt. %, at least 95 wt. %, at least 96 wt. %, at least 97 wt. %, or at least 98 wt. % C_{10-18} hydrocarbons.

9. A C_{10-12} composition comprising:

(a) from 30 to 60 wt. %, from 35 to 55 wt. %, or from 40 to 50 wt. % of the composition comprising at least 55 wt. % C_{10} mono-olefins of any one of claims 1-4, and

(b) from 38 to 68 wt. %, from 43 to 63 wt. %, or from 48 to 58 wt. % of a composition comprising at least 60 wt. % C_{12} mono-olefins, the C_{12} mono-olefins comprising:

i) at least 8 wt. % 1-dodecene; and
ii) at least 0.5 wt. % 6-hepten-l-yl-cyclopentane;

wherein the composition comprises heptylcyclopentane and n-dodecane at a weight ratio of heptylcyclopentane to n-dodecane from 0.3:1 to 8:1 .

10. The composition of claim 14, wherein the C_{10-12} composition comprises from 60 to 99 wt. %, from 70 to 98 wt. %, from 75 to 95 wt. %, or from 80 to 95 wt. % C_{10-12} mono-olefins, and/or wherein the C_{10-12} composition comprises at least 90 wt. %, at least 95 wt. %, at least 96 wt. %, at least 97 wt. %, or at least 98 wt. % C_{10-12} hydrocarbons.

11. The composition of claims 5, 7 or 9, wherein the C_{12} mono-olefins comprise:

(a) from 8 to 40 wt. %, from 9 to 35 wt. %, from 10 to 33 wt. %, from 12 to 29 wt. %, or from 13 to 23 wt. % 1-dodecene; and from 0.5 to 40 wt. %, from 1 to 35 wt. %, from 2 to 40 wt. %, from 2 to 32 wt. %, from 3 to 20 wt. %, or from 4 to 15 wt. % 6-hepten-l-yl-cyclopentane; and/or

(b) from 22 to 90 wt. %, from 29 to 88 wt. %, from 60 to 86 wt. %, from 60 to 80 wt. %, from 35 to 85 wt. %, from 33 to 50 wt. %, or from 33 to 40 wt. % non-cyclic branched C_{12} mono-olefins; and the non-cyclic branched C_{12} mono-olefins comprise 5-methyl-l -undecene, 7-methyl-1-undecene, 4-ethyl-l-decene, 6-ethyl-l-decene, 3-propyl-l-nonene, 5-propyl-1-nonene, 2-butyl-l-octene, 3-butyl-l-octene, 4-butyl-l-octene, or any combination thereof; and/or

(c) a weight ratio of 1-dodecene to 6-hepten-l -yl-cyclopentane from 0:4:1 to 12:1, from 0.6 to 10:l, from 0.9:1 to 6:l, or from 1.5:1 to 4:1.

12. The composition of claims 5, 7 or 9, wherein the composition comprising at least 60 wt. % C_{12} mono-olefins comprises:

(a) from 60 to 99 wt. %, from 62 to 97 wt. %, from 70 to 98 wt. %, or from 75 to 95 wt. % C_{12} mono-olefins; and

the weight ratio of heptylcyclopentane to n-dodecane is from 0:3:1 to 6:l, from 0.3:1 to 3:l, from 0.5:1 to 5:l, from 0.5:1 to 2:l, from 0.8:1 to 8:l, from 0.8:1 to 4:1, or from 0.8:1 to 1.8:1 ; and/or

(b) from 0.25 to 25 wt. %, from 0.5 to 23 wt.%, from 1 to 23 wt.%, from 3 to 20 wt. %, from 1 to 18 wt. %, or from 3 to 10 wt. % heptylcyclopentane; and

from 0.25 to 18 wt. %, from 0.5 to 16 wt. %, from 0.5 to 10 wt. %, from 0.75 to 8 wt. %, from 1 to 12 wt. %, from 8 to 14 wt. %, or from 0.75 to 10 wt. % n-dodecane; and/or

(c) at least 90 wt. %, at least 95 wt. %, at least 96 wt. %, at least 97 wt. %, or at least 98 wt. % C_{12} hydrocarbons.

13. The composition of claim 5 or 7, wherein the composition comprising at least 60 wt. % C_{14} mono-olefins comprises a total of from 3 to 28 wt. %, from 3 to 26 wt. %, from 4 to 28 wt. %, from 5 to 25 wt. %, or from 6 to 20 wt. % n-tetradecane and nonylcyclopentane.

14. The composition of claim 5 or 7, wherein the C_{14} mono-olefins comprise:

(a) from 12 to 50 wt. %, from 14 to 45 wt. %, from 15 to 40 wt. %, from 16 to 38 wt. %, from 18 to 36 wt. %, or from 20 to 35 wt. % 1-tetradecene; and

from 0.5 to 30 wt. %, from 0.75 to 28 wt. %, from 1.5 to 26 wt. %, from 2 to 24 wt. %, or from 5 to 15 wt. % 8-nonen-l-yl-cyclopentane; and/or

(b) from 25 to 85 wt. %, from 30 to 80 wt. %, from 45 to 80 wt. %, from 55 to 70 wt. %, from 36 to 78 wt. %, or from 50 to 75 wt. % non-cyclic branched C_{14} mono-olefins; and the non-cyclic branched C_{14} mono-olefins comprise 7-methyl-l-tridecene, 6-ethyl-l-dodecene, 5-propyl-l-undecene, 4-butyl-l-decene, 3-pentyl-l-nonene, or any combination thereof.

15. The composition of claim 5 or 7, wherein the composition comprising at least 60 wt. % C_{14} mono-olefins comprises:

(a) from 60 to 99 wt. %, from 68 to 96 wt. %, from 75 to 98 wt. %, or from 75 to 95 wt. % C_{14} mono-olefins; and a weight ratio of 1-tetradecene to 8-nonen-1-yl-cyclopentane is from 0.5:1 to 15:l, from 0.75:1 to 12:1, from 1:1 to 10:1, from 1.5:1 to 9: l, or from 2.1 to 8:l; and/or

(b) wherein the composition comprises at least 90 wt. %, at least 95 wt. %, at least 96 wt. %, at least 97 wt. %, or at least 98 wt. % C_{14} hydrocarbons.