CLAIMS

What is claimed is:

1. A continuous process for converting waste plastic into recycle for polypropylene polymerization comprising:

(a) selecting waste plastics containing polyethylene and/or polypropylene;

(b) passing the waste plastics from (a) through a pyrolysis reactor to thermally crack at least a portion of the waste plastics and produce a pyrolyzed effluent;

(c) separating the pyrolyzed effluent into offgas, a naphtha/diesel fraction, a heavy fraction, and char;

(d) passing the naphtha/diesel fraction to a refinery FCC unit;

(e) recovering a liquid petroleum gas C_3 olefin/paraffin mixture from the FCC unit;

(f) separating the C_3 paraffin and C_3 olefin into different fractions;

(g) passing the C_3 olefin to a propylene polymerization reactor; and

(h) passing the heavy fraction to an isomerization dewaxing unit to produce a base oil.

2. The process of claim 1, wherein the naphtha/diesel fraction of (d) is passed directly to a refinery FCC unit distillation section.

3. The process of claim 1, wherein a gasoline and heavy fraction is recovered from the refinery FCC unit.

4. The process of claim 1, wherein contaminants are removed at the pyrolysis reactor.

5. The process of claim 1, wherein polypropylene products are prepared from the polymerized propylene.

6. The process of claim 1, wherein the waste plastics selected in (a) are from the plastics classification groups 2, 4, and/or 5.

7. The process of claim 1, wherein a heavy fraction is recovered from the FCC unit distillation column and further processed in the refinery to clean gasoline, diesel, or jet fuel.

8. The process of claim 3, wherein the gasoline and heavy fractions produced by the FCC unit is increased with recycled pyrolysis oil.

9. The process of claim 1, wherein the amount of base oil produced by the isomerization dewaxing unit is increased with recycled pyrolysis oil.

10. The process of claim 1, wherein the heavy fraction in (h) is hydrotreated and then isomerized in the dewaxing unit.

11. The process of claim 1, wherein the volume flow of the naphtha/diesel fraction to the FCC refinery unit comprises up to 50 volume % of the total hydrocarbon flow to the FCC unit.

12. The process of claim 11, wherein the naphtha/diesel flow comprises up to 20 volume %.

13. A continuous process for converting waste plastic into recycle for polypropylene polymerization comprising:

(a) selecting waste plastics containing polyethylene and/or polypropylene;

(b) passing the waste plastics from (a) through a pyrolysis reactor to thermally crack at least a portion of the waste plastics and produce a pyrolyzed effluent;

(c) separating the pyrolyzed effluent into offgas, a naphtha/diesel fraction, a heavy fraction, and char;

(d) passing the naphtha/diesel fraction to a refinery FCC unit;

(e) recovering a liquid petroleum gas C_3 olefin/paraffin mixture from the FCC unit;

(f) separating the C_3 paraffin and C_3 olefin into different fractions;

(g) passing the C_3 paraffin to a dehydrogenation unit to produce C_3 olefin;

(h) passing the C_3 olefin to a propylene polymerization reactor; and

(i) passing the heavy fraction to an isomerization dewaxing unit to produce a base oil.

14. The process of claim 13, wherein the propylene produced in (f) and (g) is passed on to the propylene polymerization reactor.

15. The process of claim 13, wherein the naphtha/diesel fraction of (d) is passed directly to a refinery FCC unit distillation section.

16. The process of claim 13, wherein a gasoline and heavy fraction is recovered from the refinery FCC unit.

17. The process of claim 13, wherein contaminants are removed at the pyrolysis reactor.

18. The process of claim 13, wherein the waste plastics selected in (a) are from the plastics classification groups 2, 4, and/or 5.

19. The process of claim 13, wherein a heavy fraction is recovered from the FCC unit distillation column and further processed in the refinery to clean gasoline, diesel, or jet fuel.

20. The process of claim 16, wherein the gasoline and heavy fractions produced by the FCC unit is increased with recycled pyrolysis oil.

21. The process of claim 13, wherein the base oil produced by the isomerization dewaxing unit is increased with recycled pyrolysis oil.

22. The process of claim 13, wherein the heavy fraction in (i) is hydrotreated and then isomerized in the dewaxing unit.

23. The process of claim 13, wherein the volume flow of the naphtha/diesel fraction to the FCC refinery unit comprises up to 50 volume % of the total hydrocarbon flow to the FCC unit.

24. The process of claim 23, wherein the naphtha/diesel flow comprises up to 20 volume %.

25. A process for converting waste plastic to chemicals useful in preparing polypropylene and lubricating oil comprising:

(a) selecting waste plastics containing polyethylene and/or polypropylene;

(b) pyrolyzing the waste plastic and recovering a naphtha/diesel fraction and a heavy fraction;

(c) passing the naphtha/diesel fraction to a refinery FCC unit with the volume flow of naphtha/diesel fraction to the refinery FCC unit comprising up to 50 volume % of the total hydrocarbon flow to the FCC unit; and

(d) passing the heavy fraction to an isomerization dewaxing unit.