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 a pyrolysis oil comprising the naphtha/diesel fraction and the heavy fraction, and wax to a refinery FCC unit;

(e) recovering a liquid petroleum gas comprising a $C_3 – C_5$ olefin/paraffin mixture from the FCC unit;

(f) passing the liquid petroleum gas fraction to a refinery alkylation unit;

(g) recovering a propane fraction from the alkylation unit; and

(h) passing the propane fraction to a dehydrogenation unit to produce propylene.

2. The process of claim 1, wherein the pyrolysis oil and wax 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 the propylene produced in (h) is passed on to a propylene polymerization reactor to create polypropylene.

6. The process of claim 5, wherein polypropylene consumer products are prepared from the polymerized polypropylene.

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

8. The process of claim 3, wherein the gasoline recovered from the refinery FCC unit is combined with an alkylate gasoline fraction recovered from the alkylation unit.

9. The process of claim 1, wherein isobutane is added to the liquid petroleum gas stream passed to the refinery alkylation unit.

10. The process of claim 8, wherein the gasoline produced by the FCC and alkylation units is increased with recycled pyrolysis oil.

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

12. The process of claim 1, wherein the volume flow of pyrolysis oil and wax to the refinery FCC unit in (e) comprising up to 50 volume % of the total hydrocarbon flow to the FCC unit.

13. The process of claim 12, wherein the pyrolysis flow comprises up to 20 volume % of total hydrocarbon flow to the FCC unit.

14. A process for converting waste plastic into chemicals useful in preparing polypropylene, comprising:

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

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

(c) passing the pyrolysis oil and wax to a refinery FCC unit with the volume flow of pyrolysis oil and wax to the refinery FCC unit comprising up to 50 volume % of total hydrocarbon feed to the FCC unit;

(d) recovering a C_3-C_5 olefin/paraffin mixture from the FCC unit;

(e) passing the C_3-C_5 mixture to an alkylation unit; and

(f) recovering propane from the alkylation unit.