CLAIMS

What is claimed is:

1. A continuous process for converting waste plastic into naphtha for polyethylene polymerization comprising:

(a) selecting waste plastics containing polyethylene and/or polypropylene with the waste plastics containing less than 5 wt. % of polyethylene terephthalate, polyvinyl chloride and polymers of classification type 7;

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

(c) separating the pyrolyzed effluent into offgas, a pyrolysis oil and ~~optionally pyrolysis~~ wax comprising a naphtha~~/~~and diesel fraction and a heavy fraction, and char;

(d) passing the pyrolysis oil and wax to a crude unit in a refinery with the volume flow of pyrolysis oil and wax to the crude unit comprising up to but no more than about 50 volume % of the total hydrocarbon flow to the crude unit;

(e) recovering a naphtha fraction (C_5-C_8) from the crude unit;

(f) passing the naphtha fraction to a steam cracker for ethylene production.

2. The process of claim 1, wherein the pyrolysis oil and wax of (c) is passed directly to a refinery crude unit and the contaminants are removed in a crude unit desalter.

3. The process of claim 1, wherein contaminants are removed at the pyrolysis site.

4. The process of claim 1, wherein the ethylene produced in (f) is subsequently polymerized.

5. The process of claim 4, wherein polyethylene products are prepared from the polymerized ethylene.

6. The process of claim 1, wherein heavy naphtha~~/~~ and diesel~~/~~ and atmospheric gas oil ~~is~~are recovered from the crude unit and further processed in the refinery to clean gasoline, diesel or jet fuel.

7. The process of claim 6, wherein the amount of virgin crude oil processed by the crude unit is reduced with recycled pyrolysis oil.

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

9. The process of claim 1, wherein the volume flow of pyrolysis oil and wax to the crude unit in the refinery comprises up to 50 volume % of the total hydrocarbon flow to the crude unit.

10. The process of claim 9, wherein the pyrolysis oil and wax flow comprises up to 20 volume %.

11. A continuous process for converting waste plastic into a C_3-C_4 stream for polyethylene polymerization comprising

(a) selecting waste plastics containing polyethylene and/or polypropylene with the waste plastics containing less than 5 wt. % of polyethylene terephthalate, polyvinyl chloride and polymers of classification type 7;

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

(c) separating the pyrolyzed effluent into offgas, a pyrolyzed oil and ~~optionally~~ wax comprising a naphtha~~/~~ and diesel fraction and heavy fraction, and char;

(d) passing the pyrolysis oil and wax to a crude unit in a refinery with the volume flow of pyrolysis oil and wax to the crude unit comprising up to but no more than about 50 volume % of the total hydrocarbon flow to the crude unit;

(e) recovering a portion of propane and butane (C_3-C_4) fraction from the crude unit; and

(f) passing the C_3-C_4 fraction to a steam cracker for ethylene production.

12. The process of claim 11, wherein the pyrolysis oil and wax of (c) is passed directly to a refinery crude unit and the contaminants are removed in a crude until desalter.

13. The process of claim 11, wherein contaminants are removed at the pyrolysis site.

14. The process of claim 11, wherein the ethylene produced in (f) is subsequently polymerized.

15. The process of claim 11, wherein the polyethylene products are prepared from the polymerized ethylene.

16. The process of claim 11, wherein heavy naphtha~~/~~ and diesel~~/~~ and atmospheric gas oil ~~is~~are recovered from the crude unit and further processed in the refinery to clean gasoline, diesel or jet fuel.

17. The process of claim 11, wherein the volume flow of pyrolysis oil and wax to the crude unit in the refinery comprises up to 50 volume % of the total hydrocarbon flow to the crude unit.

18. The process of claim 17, wherein the pyrolysis oil and wax flow comprises up to 20 volume %.

19. The process of claim 11, wherein the waste plastics selected in (a) are from plastics classification group 2, 4 and/or 5.

20. A process for converting waste plastic into chemicals useful in preparing polyethylene, comprising:

(a) selecting waste plastics containing polyethylene and/or polypropylene with the waste plastics containing less than 5 wt. % of polyethylene terephthalate, polyvinyl chloride and polymers of classification type 7;

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

(c) passing the pyrolysis oil and wax to a crude unit in a refinery with the volume flow of pyrolysis oil and wax to the crude unit comprising up to but no more than about 50 volume % of the total hydrocarbon flow to the crude unit.