CLAIMS

What is claimed is:

1. A method of processing waste plastic, said method comprising:

(a) separating mixed plastic waste (MPW) into a polyethylene terephthalate-enriched (PET-enriched) stream and a polyolefin-enriched (PO-enriched) stream;

(b) subjecting at least a portion of said PET-enriched stream to solvolysis in a solvolysis facility; and

(c) subjecting at least a portion of said PO-enriched stream to at least one of (i) partial oxidation (POX) gasification facility; (ii) pyrolysis in a pyrolysis facility; and (iii) chemical conversion in an energy generation facility.

2. The method of claim 1, wherein said PO-enriched stream comprises not more than 40 weight percent of polyethylene terephthalate, based on the total weight of the stream and wherein said PET-enriched stream comprises not more than 40 weight percent of polyolefin, based on the total weight of the stream.

3. The method of claim 1, wherein said PET-enriched stream comprises at least 0.1 and not more than 10 weight percent (on a dry basis) of halogens, based on the total weight of said stream.

4. The method of claim 1, further comprising combining said PO-enriched stream with another stream to provide a combined stream and introducing the combined stream into one of (i) through (iii).

5. The method of claim 4, wherein said another stream comprises a solvolysis coproduct stream, and said solvolysis coproduct stream is formed by subjecting at least a portion of said PET-enriched stream to solvolysis in a solvolysis facility.

6. The method of claim 4, wherein said another stream originates from at least one of said pyrolysis facility, a solidification facility, or a cracking facility.

7. The method of claim 1, wherein at least a portion of said PO-enriched stream is introduced into said POX gasification facility.

8. The method of claim 1, wherein step (c) includes subjecting at least a portion of said PO-enriched stream to two or more of (i) through (iii).

9. The method of claim 1, wherein said MPW comprises PVC in an amount of at least 0.001 and/or not more than 5 weight percent, based on the total weight of said MPW, wherein said MPW comprises at least 0.1 and/or not more than 25 weight percent of non-plastic solids, based on the total weight of said MPW, wherein said MPW comprises at least 5 weight percent PET, based on the total weight of said MPW, and at least 5 weight percent PO, based on the total weight of said MPW.

10. A method of processing waste plastic, said method comprising:

(a) separating mixed plastic waste (MPW) into a polyethylene terephthalate-enriched (PET-enriched) stream and a polyolefin-enriched (PO-enriched) stream;

(b) subjecting at least a portion of said PO-enriched steam to at least one of (i) a partial oxidation (POX) gasification facility; (ii) pyrolysis in a pyrolysis facility; and (iii) chemical conversion in an energy generation facility,

wherein said PO-enriched stream comprises at least 50 weight percent polyolefin (PO) and has one or more of the following characteristics (i) through (vii) –

(i) an ash content of not more than about 5 weight percent;

(ii) a halogen content of not more than 250 ppm by weight (on a dry basis);

(iii) not more than 5 weight percent of nitrogen-containing compounds;

(iv) not more than 10 weight percent of polyethylene terephthalate;

(v) a mercury content of not more than 1 ppm;

(vi) an arsenic content of not more than 100 ppm; and

(vii) a melt viscosity of less than 25,000 poise measured at 10 rad/s and 250°C.

11. The method of claim 10, wherein said MPW comprises at least 0.1 and/or not more than 25 weight percent of non-plastic solids, based on the total weight of said MPW.

12. The method of claim 10, wherein said PO-enriched stream comprises two of said characteristics (i) through (vii).

13. The method of claim 10, further comprising subjecting at least a portion of said PET-enriched stream to solvolysis in a solvolysis facility; withdrawing at least one coproduct stream from said solvolysis facility; and introducing at least a portion of said coproduct stream to said pyrolysis facility, said POX facility, said energy generation facility, a cracking facility, and/or a solidification facility.

14. The method of claim 13, further comprising combining at least a portion of said solvolysis coproduct stream with said PO-enriched stream and subjecting the combined stream to at least one of (i) through (iii).

15. The method of claim 13, wherein said solvolysis facility comprises a methanolysis facility.

16. A method of processing waste plastic, said method comprising:

introducing a feed stream comprising at least 50 weight percent polyolefin (PO) into at least one of (i) a partial oxidation (POX) gasification facility; (ii) a pyrolysis facility; and (iii) an energy generation facility, wherein at least a portion of said feed stream comprises plastic not classified as #3 through #7 plastics.

17. The method of claim 16, wherein said feed stream comprises at least 5 and not more than 95 weight percent of plastic not classified as #3 through #7.

18. The method of claim 16, wherein said feed stream comprises not more than 25 weight percent of polyethylene terephthalate (PET), based on the total weight of the stream.

19. The method of claim 16, wherein said feed stream has an ash content of not more than 5 weight percent, a halogen content of not more than 250 ppm by weight (on a dry basis), an amount of nitrogen-containing compounds of not more than 5 weight percent, an amount of oxygenated compounds in an amount of not more than 5 weight percent, a mercury content of not more than 10 ppm, not more than 10 weight percent of polyethylene terephthalate, an arsenic content of not more than 100 ppm, and a melt viscosity of not more than 25,000 poise, measured using a Brookfield R/S rheometer with V80-40 vane spindle operating at a shear rate of 10 rad/s and a temperature of 250°C.

20. The method of claim 16, comprising introducing a feed stream comprising at least 50 weight percent polyolefin (PO) into said partial oxidation (POX) gasification facility.