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 producing a principal terephthalyl product and a principal glycol product, and one or more solvolysis coproducts comprising a polyolefin-containing coproduct stream, a glycol column bottoms coproduct stream, or a terephthalyl column bottoms;

(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, and

(d) introducing at least one of said solvolysis coproduct streams to at least one of (i)-(iii).

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. The method of claim 1, 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.