

WHAT IS CLAIMED IS:

1. A process for the production of hydrocarbons from an oxygenated polymer, the process comprising:

contacting reactant hydrogen and a feed comprising a flowable form of the oxygenated polymer with a solid hydrodeoxygenation (HDO) catalyst at a hydrogen partial pressure from about 14 bar (about 200 psi) to about 35 bar (about 510 psi), to provide an HDO product comprising the hydrocarbons.
2. The process of claim 1, wherein the reactant hydrogen comprises both fresh and recycle hydrogen.
3. The process of claim 1 or claim 2, wherein the feed comprising the flowable form of the oxygenated polymer accounts for greater than about 90 wt-% of non-gaseous components added to an HDO reactor containing the HDO catalyst.
4. The process of any one of claims 1 to 3, wherein a yield of solids from the process, based on the feed, is less than about 1 wt-%.
5. The process of any one of claims 1 to 4, wherein the oxygenated polymer is a bio-based thermoplastic polymer or a petroleum-based thermoplastic polymer.
6. The process of any one of claims 1 to 5, wherein the HDO product is provided following further deoxygenating of a partially deoxygenated intermediate.
7. The process of any one of claims 1 to 6, wherein the HDO product is provided following a separation from a gaseous mixture and/or aqueous product.
8. The process of claim 7, wherein the oxygenated polymer has nitrogen and/or sulfur atoms, and wherein the gaseous mixture comprises ammonia (NH₃) and hydrogen sulfide (H₂S) derived from the nitrogen and/or sulfur atoms.
9. The process of any one of claims 1 to 8, wherein the flowable form of the oxygenated polymer is obtained by heating the oxygenated polymer.

10. The process of claim 9, wherein the flowable form of the oxygenated polymer is obtained by both heating the oxygenated polymer and combining the oxygenated polymer with a solvent.
11. The process of claim 10, wherein the solvent comprises hydrocarbons or forms hydrocarbons in the process.
12. The process of claim 11, wherein the solvent is product of crude oil refining or paper manufacturing.
13. The process of any one of claims 1 to 12, wherein the oxygenated polymer is polyethylene terephthalate (PET) and the hydrocarbons include para-xylene.
14. The process of any one of claims 1 to 13, wherein the oxygenated polymer is lignin and the hydrocarbons include gasoline boiling-range hydrocarbons and diesel boiling-range hydrocarbons.
15. The process of any one of claims 1 to 14, wherein the solid HDO catalyst comprises at least one Group 8 metal and at least one Group 6 metal, supported on an inorganic refractory metal oxide, a zeolite, or porous activated carbon.
16. An integrated hydrodeoxygenation (HDO) process comprising:
 - preparing a flowable form of an oxygenated polymer;
 - feeding the flowable form of the oxygenated polymer and reactant hydrogen to an HDO reactor containing a solid HDO catalyst and operating at a hydrogen partial pressure from about 14 bar (about 200 psi) to about 35 bar (about 510 psi),
 - withdrawing an HDO reactor effluent, and
 - obtaining, from the HDO reactor effluent, an HDO product comprising hydrocarbons.
17. The process of claim 16, wherein obtaining the HDO product comprises separating the HDO product from the HDO reactor effluent.
18. The process of claim 16 or claim 17, wherein the HDO reactor effluent comprises a partially deoxygenated intermediate and obtaining the HDO product comprises further deoxygenating the partially deoxygenated intermediate in a supplemental deoxygenation

reactor, withdrawing a supplemental deoxygenation reactor effluent, and separating the HDO product from the supplemental deoxygenation reactor effluent.

19. The process of any one of claims 16 to 18, wherein the HDO reactor is a trickle bed reactor or a slurry reactor.
20. The process of any one of claims 16 to 19, wherein the effluent from the HDO reactor, from which the HDO product is obtained, is a gaseous HDO reactor effluent or a liquid HDO reactor effluent.
21. The process of any one of claims 16 to 20, wherein the HDO product is obtained following a separation from a gaseous mixture and/or aqueous product.
22. The process of any one of claims 16 to 21, wherein the oxygenated polymer has nitrogen and/or sulfur atoms, and wherein the gaseous mixture comprises ammonia (NH_3) and hydrogen sulfide (H_2S) derived from the nitrogen and/or sulfur atoms.
23. A process for the production of an upgraded polymer from a waste oxygenated polymer having oxygen atoms in a backbone of the oxygenated polymer, the process comprising:

contacting reactant hydrogen and a feed comprising a flowable form of the oxygenated polymer with a solid hydrodeoxygenation (HDO) catalyst at a hydrogen partial pressure from about 14 bar (about 200 psi) to about 35 bar (about 510 psi), to provide an HDO product comprising hydrocarbons obtained from molecular sub-units between the oxygen atoms in the backbone of the oxygenated polymer,

using the hydrocarbons for the production of the upgraded polymer.
24. The process of claim 23, wherein the waste oxygenated polymer is polyethylene terephthalate (PET).