8. The method of claim 1 wherein exposing the composition to the catalyst is performed in a hydrogen-deficient atmosphere.

9. The method of claim 8 wherein the catalyst is disposed in a column, the method further comprising flowing the composition and a non-hydrogen gas through the column.

10. The method of claim 9 wherein the non-hydrogen gas comprises nitrogen, argon, 1%-100% oxygen, air, or a combination thereof.

11. The method of claim 1 wherein the method is performed in the presence of a hydrogen scavenger.

12. The method of claim 11 wherein the hydrogen scavenger is oxygen.

13. The method of claim 1 wherein the product comprises alkyl-substituted aromatic compounds.

14. The method of claim 1 wherein the product comprises alkylated benzenes.

15. The method of claim 1 wherein the product is suitable for use as an aviation fuel.

16. The method of claim 1 wherein the fatty acids are obtained from a plant oil, a plant fat, an animal fat, or any combination thereof.

17. The method of claim 1 wherein the fatty acids comprise oleic acid, linoleic acid, or a combination thereof.

18. The method of claim 1 wherein the fatty acids in the composition are free fatty acids, fatty acid esters, fatty acid monoglycerides, fatty acid diglycerides, fatty acid triglycerides, or any combination thereof.

19. The method of claim 1, wherein the composition comprises free fatty acids, the method further comprising:

providing a source of triglycerides;

hydrolyzing the triglycerides to produce free fatty acids and glycerol;

exposing the free fatty acids to the catalyst; and

dehydrogenating at least 10% of the fatty acids with the catalyst to produce the product comprising branched, cyclic, and/or aromatic compounds.

20. A method, comprising:

providing a catalyst comprising platinum combined with Ge, Sn, or a combination thereof, wherein the catalyst is disposed in a column;

flowing a composition comprising fatty acids and a non-hydrogen gas through the column; and

dehydrogenating at least 10% of the fatty acids with the catalyst to produce a product comprising branched, cyclic, and/or aromatic compounds.

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