CLAIMS:

1. A method for the production of iso-octene, comprising:

exposing a *tert*-butyl alcohol ("TBA") containing feed, comprising one or more oxygenates, wherein the one or more oxygenates is selected from water, methanol, and acetone, to a first solid acid catalyst, wherein the first solid acid catalyst comprises a crystalline microporous material of MWW framework topology, under dehydration conditions to convert a portion of TBA to isobutene to form an isobutene containing feed; and

directly exposing at least a portion of the isobutene containing feed to a second solid acid catalyst, wherein the second solid acid catalyst comprises a crystalline microporous material of MWW framework topology, under dimerization conditions to dimerize isobutene molecules in the isobutene containing feed to iso-octene to form an iso-octene containing feed;

wherein greater than 50% of iso-octene molecules in the iso-octene containing feed comprise trimethylpentene.

2. The method of claim 1, wherein the crystalline microporous material of MWW framework topology of either the first or second solid acid catalyst is selected from the group consisting of MCM-22, PSH-3, SSZ-25, ERB-1, ITQ-1, ITQ-2, MCM-36, MCM-49, MCM-56, EMM-10, EMM-12, EMM-13, UZM-8, UZM-8HS, UZM-37, MIT-1, and mixtures thereof.

3. The method of claim 1, wherein the crystalline microporous material of MWW framework topology of either the first or second solid acid catalyst is any of MCM-22, MCM-36, MCM-49 and MCM-56.

4. The method of claim 3, wherein greater than 90% of the iso-octene molecules in the iso-octene containing feed comprise trimethylpentene.

5. The method of claim 3, wherein greater than 95% of the iso-octene molecules in the iso-octene containing feed comprise trimethylpentene.

6. The method of claim 3, wherein the trimethylpentene comprises 2,4,4,-trimethyl-1-pentene and 2,4,4,-trimethyl-2-pentene, wherein the ratio of 2,4,4,-trimethyl-1-pentene to 2,4,4,-trimethyl-2-pentene is greater than about 2.

7. The method of claim 3, wherein the trimethylpentene comprises 2,4,4,-trimethyl-1-pentene and 2,4,4,-trimethyl-2-pentene, wherein the ratio of 2,4,4,-trimethyl-1-pentene to 2,4,4,-trimethyl-2-pentene is from about 2 to about 4.

8. The method of claim 1, wherein the TBA containing feed is produced by oxidizing isobutane.

9. The method of claim 1, wherein the dimerization conditions include a dimerization temperature of about 100°C to about 210°C.

10. The method of claim 1, wherein the dimerization conditions include a dimerization temperature of about 150°C to about 190°C.

11. The method of claim 1, wherein the dimerization conditions include a dimerization pressure of about 15 psig to about 1000 psig.

12. The method of claim 1, wherein the TBA containing feed further comprises C_{4+} isoparaffins.

13. The method of claim 12, wherein the TBA containing feed further comprises acetone and methanol to form a TBA blend.

14. The method of claim 1, wherein the iso-octene containing feed has an octane rating, as determined by (RON + MON) / 2, of at least 95.

15. The method of claim 1, further comprising hydrogenating the iso-octene containing feed to form an iso-octane containing feed.

16. The method of claim 1, wherein the iso-octane containing feed has an octane rating, as determined by (RON + MON) / 2, of at least 100.

17. The method of claim 1, wherein the first solid acid catalyst comprises a mixed metal oxide based on oxides of Fe/W/Zr, W/Zr, Ce/W/Zr, Cu/W/Zr, Mn/W/Zr, or a combination thereof.

18. The method of claim 1, wherein the first solid acid catalyst further comprises an inorganic oxide binder.

19. The method of claim 1, wherein an isobutane feed is co-fed with the TBA containing feed.

20. The method of claim 19, wherein a portion of the isobutane containing feed is oxidized to produce the TBA containing feed.

21. The method of claim 1, wherein the first solid acid catalyst and the second solid acid catalyst are the same.

22. The method of claim 1, further comprising adding an amount of water to the TBA containing feed in addition to water formed during the conversion of TBA to isobutene.

23. The method of claim 13, further comprising removing methanol or acetone from the TBA blend and processing the removed methanol or acetone in a separate refinery application.