CLAIMS:

1. A method for the production of high octane hydrocarbon, comprising:

oxidizing an isobutane containing feed in the presence of oxygen to form an oxidation effluent comprising tert-butyl alcohol ("TBA") and an oxygenate impurity wherein the oxygenate impurity comprises water, methanol, and acetone, wherein at least 0.5 wt% of the isobutane in the isobutane containing feed is converted under the oxidation conditions;

directly exposing at least a portion of the oxidation effluent to a first solid acid catalyst, wherein the first solid acid catalyst comprises a crystalline microporous material of the MWVV framework topology, under dehydration conditions to form a dehydration effluent comprising C_4 hydrocarbons; at least 80% of the TBA being converted under the dehydration conditions; and

directly exposing at least a portion of the dehydration effluent to a second solid acid catalyst, wherein the second solid acid catalyst comprises a crystalline microporous material of the MWW framework topology, under dimerization conditions to form a dimerization effluent comprising C_8 hydrocarbons, wherein at least 90% of the C_8 hydrocarbons in the dimerization effluent are C_8 olefins.

2. The method of claim 1, further comprising hydrogenating the C_8 olefins.

3. The method of claim 1, further comprising converting an n-butane containing feed to isobutane via isomerization over a bifunctional catalyst to form the isobutane containing feed.

4. The method of claim 3, further comprising:

hydrogenating the C_8 olefins; and

recycling a portion of unconverted n-butane, unconverted isobutane, or a combination of unconverted n-butane and unconverted isobutane resulted from the isomerization and/or the oxidation to the n-butane containing feed.

5. The method of claim 4, wherein the recycling occurs after the hydrogenating.

6. The method of claim 4, wherein the recycling occurs after the oxidizing and before exposing at least a portion of the oxidation effluent to the first solid acid catalyst under the dehydration conditions.

7. The method of claim 1, wherein the crystalline microporous material of the 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.

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

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 oxidation effluent further comprises C_{4+} isoparaffins and C_{4+} n-paraffins.

13. The method of claim 1, wherein the C_8 hydrocarbons in the dimerization effluent have an octane rating, as determined by (RON + MON) / 2, of at least 95.

14. 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.

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

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