CLAIMS

1. A process for producing BTEX or gasoline, the process comprising:

contacting, at elevated temperature, a feedstock comprising at least one renewable oil with a ~~catalyst comprising a catalytically active form of gallium~~zeolitic catalyst that is gallium-modified to comprise gallium cations in a ratio of about 1/1 Ga/framework-Al to produce a product stream comprising BTEX.

2. A process as in Claim 1, wherein said renewable oil is canola oil.

3. A process as in Claim 2, wherein BTEX is in said product stream in a yield of greater than 35 wt-%.

4. A process as in Claim 1, wherein said renewable oil is algae oil.

5. A process as in Claim 4, wherein said renewable oil is crude algae oil extracted from a green alga or a blue-green alga.

6. A process as in Claim 4, wherein BTEX is in said product stream in a yield of greater than 42 wt-%.

7. A process as in Claim 3, wherein said product stream comprises a yield of greater than 15% wt-% Benzene.

8. A process as in Claim 6, wherein said product stream comprises a yield of greater than 15% wt-% Benzene.

~~9. A process as in any one of Claims 1-8, wherein said catalyst is a zeolitic catalyst that is gallium-modified to comprise gallium cations in a ratio of about 1/1 Ga/framework-Al.~~

~~10~~9. A process as in any one of Claims 1 -8, wherein said contacting is done in a single reactor.

~~11~~10. A process as in any one of Claims 1-8, wherein said contacting is done in a series of at least a first reactor and a second reactor, wherein liquid is removed from the intermediate product stream between the first and second reactors, and vapor from the first reactor is fed to said second reactor.

~~12~~11. A process as in any one of Claims 1-8, wherein said contacting is done in a fixed-bed reactor.

~~13~~12. A process as in any one of Claims 1-8, wherein said contacting is done in a moving catalyst bed.

~~14~~13. A process as in any one of Claims 1 -8, wherein said contacting is done in a riser of a fluidized catalytic cracking unit.

~~15~~14. A process as in Claim ~~14~~13, wherein said contacting is done at 510 to 555 degree C temperature.

~~16~~15. A process as in Claim ~~14~~13, wherein said contacting is done at 400 – 555 degrees C temperature.

~~17~~1616. A process as in Claim ~~14~~13, wherein said contacting is done for 2 – 4 seconds.

~~18~~17. A process as in any of Claims 1, 4 - 6, and 8, wherein said renewable oil is algae oil that has not been processed between being extracted from algae and said contacting.

~~19~~18. A process as in any one of Claims 1, 4 – 6, and 8, wherein said algae oil has been processed in a RBD process and/or a degumming process.

~~20~~19. A process as in any one of Claims 1, 4 – 6, and 8, wherein said algae oil has not been processed in a RBD process and/or a degumming process.

~~21~~20. A process as in any one of Claims 1, 4 – 6, and 8, wherein said algae oil has been hydrotreated prior to said contacting.

~~22~~21. A process as in any one of Claims 1-~~21~~20, wherein said renewable oil is 1 – 100 wt% of said feedstock.

~~23~~22. A process as in any one of Claims 1 – ~~21~~20, wherein said renewable oil is 1 – 20 wt% of said feedstock.

~~24~~23. A process as in any one of Claims 1 – ~~21~~20, wherein said renewable oil is 80 - 100 wt% of said feedstock.

~~25~~24. A process as in any one of Claims 1 – ~~21~~20, wherein said renewable oil is 90 - 100 wt% of said feedstock.

~~26~~25. A process as in any one of Claims 1 - ~~21~~20, wherein the catalyst is a gallium-doped form of one or more zeolite-alumina matrix catalysts with pore sizes having 10 oxygen atoms in the pore mouth.

~~27~~26. A process as in Claim ~~26~~25, wherein said catalyst is a gallium-doped form of a zeolitic catalyst selected from the group consisting of: ZSM-5, ZSM-11, ZSM-23, MCM-70, SSZ-44, SSZ-58, SSZ-35, and ZSM-22.

~~28~~27. A process for producing BTEX aromatics and/or hydrogen from renewable oil, the process comprising:

providing a reactor vessel or riser containing catalyst, said catalyst comprising a gallium-cation catalyst; and

contacting a feedstsock with said catalyst at elevated temperature;

wherein said feedstock comprises renewable oil selected from the group consisting of: oil derived from biomass living in the past 50 years; canola oil; oils extracted from vegetables including corn, soybean, sunflower, and sorghum; algae oil from naturally-occurring algae; algae oil from genetically modified algae; oil from seeds; oil from fungi; and oil from a photosynthetic or non-photosynthetic bacteria; and the gallium-cation catalyst in said reactor vessel or riser is at a weight percentage equal to the weight percentage of the renewable oil in the feedstock.

~~29. A process as in Claim 28, wherein said renewable oil is 1 – 100 wt% of said feedstock, and said gallium-cation catalyst is 1 – 100 wt% of said catalyst in the reactor vessel or riser.~~

~~30~~28. A process as in Claim ~~28~~27, wherein said renewable oil is 1 – 20 wt% of said feedstock, and said gallium-cation catalyst is 1 - 20 wt% of said catalyst in the reactor vessel or riser.

~~31~~29. A process as in Claim ~~28~~27, wherein said renewable oil is 80 – 100 wt% of said feedstock, and said gallium-cation catalyst is 80 – 100 wt% of said catalyst in the reactor vessel or riser.

~~32~~30. A process as in Claim ~~28~~27, wherein said renewable oil is 90 – 100 wt% of said feedstock, and said gallium-cation catalyst is 90 – 100 wt% of said catalyst in the reactor vessel or riser.

~~33. A process as in Claim 28, wherein said the weight percentage of gallium-cation catalyst in the reactor vessel or riser is equal to the weight percentage of renewable oil in the feedstock.~~

~~34~~31. A process as in any one of Claims ~~28-33~~27-30, wherein said riser is a fluidized catalytic cracking unit (FCC) riser.

~~35~~32. A process as in Claim ~~34~~31, wherein said catalyst further comprises a Y-Zeolite FCC catalyst in said riser.

~~36~~33. A process as in any one of Claims ~~28—33~~27-30, wherein said reactor vessel is a moving-bed vessel adapted so that said catalyst moves through the reactor vessel by gravity.

~~37~~34. A process as in any one of Claims ~~28—33~~27-30, wherein said reactor vessel is a fixed-bed reactor.

~~38~~35. A process as in any one of Claims ~~28—33~~27-30, wherein said elevated temperature is in the range of 375 – 425 degrees C.

~~39~~36. A process as in any one of Claims ~~28—33~~27-30 wherein said elevated temperature is in the range of 350 – 555 degrees C.

~~40~~37. A process for producing BTEX aromatics or gasoline from a renewable oil obtained from a non-vascular photosynthetic organism, the process comprising contacting a feedstock comprising said renewable oil at elevated temperature with a catalyst that retains gallium in a catalytically-active form, wherein said catalyst and said renewable oil are in present in equal weight percentages.

~~41~~38. A process as in Claim ~~40~~37, wherein said catalyst is a gallium-doped form of one or more zeolite-alumina matrix catalysts with pore sizes having 10 oxygen atoms in the pore mouth.

~~42~~39. A process as in Claim ~~40~~38, wherein said catalyst is a gallium-doped form of a zeolitic catalyst selected from the group consisting of: ZSM-5, ZSM-11, ZSM-23, MCM-70, SSZ-44, SSZ-58, SSZ-35, and ZSM-22.

~~43~~40. A process as in Claim ~~40~~37, wherein said catalyst comprises gallium cations.

~~44~~41. A process as in Claim ~~40~~37, wherein said elevated temperature is in the range of 350 - 555 degree C.

~~45~~42. A process as in Claim ~~40~~37, wherein said elevated temperature is in the range of 375 – 425 degrees C.

~~46~~43. A process as in Claim ~~40~~37, wherein said feedstock is 100% oil obtained from a non-vascular photosynthetic organism.

~~47~~44. A process as in Claim ~~40~~37 wherein said feedstock is 90 – 100% oil obtained from a non-vascular photosynthetic organism.

~~48~~45. A process as in Claim ~~40~~37, wherein said feedstock is 80 – 100% oil obtained from a non-vascular photosynthetic organism.

~~49~~46. A process as in Claim ~~40~~37, wherein said feedstock is 50 – 100% oil obtained from a non-vascular photosynthetic organism.

~~50~~47. A process as in Claim ~~39~~37, wherein said feedstock is 1 – 20 wt% oil obtained from a non-vascular photosynthetic organism.

~~51~~48. A process as in any one of Claims ~~46—50~~43-47, wherein said oil obtained from a non-vascular photosynthetic organism is extracted from naturally-occurring algae or cyanobacteria.

~~52~~49. A process as in any one of Claims ~~46—50~~43-47, wherein said oil obtained from a non-vascular photosynthetic organism is extracted from genetically-modified algae or cyanobacteria.

~~53~~50. A process as in any one of Claims ~~47—52~~44-47, wherein the remainder of the feedstock that is not oil obtained from a non-vascular photosynthetic organism is selected from the group

consisting of one or more fossil oil fractions, one or more refined fossil oil products or fractions, naphtha, gasoline, jet fuel, diesel, and any combination thereof.

~~54~~51. A renewable oil product made by a process comprising any of the processes of Claims 1 – ~~53~~50.