WHAT IS CLAIMED IS:

1. A method comprising:

contacting a heated reaction gas comprising methane with a first catalyst and a second catalyst to catalyze production of an aromatic hydrocarbon,

wherein said first catalyst is active for catalyzing conversion of methane to ethane and is more active than said second catalyst for catalyzing aromatization of methane, and said second catalyst is more active than said first catalyst for catalyzing aromatization of ethane, and

wherein said heated reaction gas initially contacts said first catalyst before contacting said second catalyst, or contacts a mixture of said first catalyst and said second catalyst.

2. The method of claim 1, wherein at least one of said first and second catalysts is an aluminosilicate zeolite modified by a transition metal.

3. The method of claim 2, wherein said first catalyst is a MCM-22 zeolite modified by a first transition metal, and said second catalyst is a ZSM-5 zeolite modified by a second transition metal.

4. The method of claim 3, wherein each of said first transition metal and said second transition metal is molybdenum.

5. The method of claim 4, wherein each one of said first and second catalysts comprises about 3 to about 12 wt% of molybdenum.

6. The method of claim 4, wherein each one of said first and second catalysts has a Si/2Al ratio of from 25 to 45.

7. The method of claim 1, wherein said heated reaction gas is heated to a temperature of about 600 to about 700 °C.

8. The method of claim 1, wherein, prior to said contacting, said first and second catalysts are heated to at least 300 °C in the presence of propane.

9. The method of claim 1, wherein the weight ratio of said first and second catalysts is about 1:1.

10. A reactor for producing aromatic hydrocarbons from a reaction gas comprising methane, comprising:

a conduit defining a reaction zone for the reaction gas to react therein; and

a first catalyst and a second catalyst in said reaction zone, wherein said first catalyst is active for catalyzing conversion of methane to ethane and is more active than said second catalyst for catalyzing aromatization of methane, and said second catalyst is more active than said first catalyst for catalyzing aromatization of ethane, and wherein said first catalyst is upstream of said second catalyst or mixed with said second catalyst.

11. The reactor of claim 10, wherein at least one of said first and second catalysts is an aluminosilicate zeolite modified by a transition metal.

12. The reactor of claim 11, wherein said first catalyst is a MCM-22 zeolite modified by a first transition metal, and said second catalyst is a ZSM-5 zeolite modified by a second transition metal.

13. The reactor of claim 12, wherein each of said first transition metal and said second transition metal is molybdenum.

14. The reactor of claim 13, wherein each one of said first and second catalysts comprises about 3 to about 12 wt% of molybdenum.

15. The reactor of claim 13, wherein each one of said first and second catalysts has a Si/2Al ratio of from 25 to 45.

16. The reactor of claim 10, wherein the weight ratio of said first and second catalysts is about 1:1.

17. The reactor of claim 10, wherein said first catalyst is upstream of said second catalyst.

18. The reactor of claim 10, wherein said first catalyst is mixed with said second catalyst.

19. The method of claim 1, wherein said heated reaction gas contacts said first catalyst before contacting said second catalyst.

20. The method of claim 19, wherein said first catalyst is in an upstream reaction zone, and said second catalyst is in a downstream reaction zone.

21. The method of claim 1, wherein said first catalyst and said second catalyst form said mixture.

WHAT IS CLAIMED IS:

1. A method comprising:

contacting a heated reaction gas comprising methane with a first catalyst and a second catalyst to catalyze production of an aromatic hydrocarbon,

wherein said first catalyst is active for catalyzing conversion of methane to ethane and is more active than said second catalyst for catalyzing aromatization of methane, and said second catalyst is more active than said first catalyst for catalyzing aromatization of ethane, and

wherein said heated reaction gas initially contacts said first catalyst before contacting said second catalyst, or contacts a mixture of said first catalyst and said second catalyst.

2. The method of claim 1, wherein at least one of said first and second catalysts is an aluminosilicate zeolite modified by a transition metal.

3. The method of claim 2, wherein said first catalyst is a MCM-22 zeolite modified by a first transition metal, and said second catalyst is a ZSM-5 zeolite modified by a second transition metal.

4. The method of claim 3, wherein each of said first transition metal and said second transition metal is molybdenum.

5. The method of claim 4, wherein each one of said first and second catalysts comprises about 3 to about 12 wt% of molybdenum.

6. The method of claim 4, wherein each one of said first and second catalysts has a Si/2Al ratio of from 25 to 45.

7. The method of claim 1, wherein said heated reaction gas is heated to a temperature of about 600 to about 700 °C.

8. The method of claim 1, wherein, prior to said contacting, said first and second catalysts are heated to at least 300 °C in the presence of propane.

9. The method of claim 1, wherein the weight ratio of said first and second catalysts is about 1:1.

10. A reactor for producing aromatic hydrocarbons from a reaction gas comprising methane, comprising:

a conduit defining a reaction zone for the reaction gas to react therein; and

a first catalyst and a second catalyst in said reaction zone, wherein said first catalyst is active for catalyzing conversion of methane to ethane and is more active than said second catalyst for catalyzing aromatization of methane, and said second catalyst is more active than said first catalyst for catalyzing aromatization of ethane, and wherein said first catalyst is upstream of said second catalyst or mixed with said second catalyst.

11. The reactor of claim 10, wherein at least one of said first and second catalysts is an aluminosilicate zeolite modified by a transition metal.

12. The reactor of claim 11, wherein said first catalyst is a MCM-22 zeolite modified by a first transition metal, and said second catalyst is a ZSM-5 zeolite modified by a second transition metal.

13. The reactor of claim 12, wherein each of said first transition metal and said second transition metal is molybdenum.

14. The reactor of claim 13, wherein each one of said first and second catalysts comprises about 3 to about 12 wt% of molybdenum.

15. The reactor of claim 13, wherein each one of said first and second catalysts has a Si/2Al ratio of from 25 to 45.

16. The reactor of claim 10, wherein the weight ratio of said first and second catalysts is about 1:1.

17. The reactor of claim 10, wherein said first catalyst is upstream of said second catalyst.

18. The reactor of claim 10, wherein said first catalyst is mixed with said second catalyst.

19. The method of claim 1, wherein said heated reaction gas contacts said first catalyst before contacting said second catalyst.

20. The method of claim 19, wherein said first catalyst is in an upstream reaction zone, and said second catalyst is in a downstream reaction zone.

21. The method of claim 1, wherein said first catalyst and said second catalyst form said mixture.