**CLAIMS:**

1. A method for selective catalytic reduction of NOx ~~in an exhaust stream from a combustion operation containing NO, which comprises~~ comprising:

providing an exhaust stream from a combustion stream, the exhaust stream containing an amount of NO;

introducing at least a portion of the exhaust stream to a first catalytic reactor comprising a first catalyst at suitable operating conditions to convert an amount of NO in the exhaust stream to $NO_2$, wherein the ~~a~~ first catalyst is selected from the group consisting of bulk $Co_3O_4$, Ru loaded on a metal oxide, ~~or~~ and Pt loaded on a metal oxide ~~to convert NO in the exhaust stream to NO2~~;

directing the exhaust stream with $NO_2$ from the first catalyst ~~with~~ and a reductant stream including a low molecular weight aldehyde to a second catalyst ~~comprising a potassium-loaded~~ including a zeolite at suitable operating conditions to reduce at least a portion of the $NO_2$ to $N_2$.

2. The method of claim 1, wherein the first catalytic reactor includes a vessel, and the second catalyst is within the vessel of the first catalytic reactor.

3. The method of claim 1, wherein the second catalyst is in a second catalytic reactor located downstream of the first catalytic reactor.

4. The method ~~according to anyone of the preceding claims~~ of claim 1, wherein the low-molecular aldehyde is ~~acetadehyde~~ acetaldehyde.

5. The method of claim 4, wherein the exhaust stream includes between about 0.1 % and about 20 % oxygen and about 1-10 % water.

6. The method of claim 4, wherein the operating temperature of the first catalytic reactor is between about 150 °C and about 450 °C.

7. The method of claim 4, wherein the operating temperature of the first catalytic reactor is about 300 °C.

8. The method of claim 4, wherein the operating temperature of the second catalyst is about 150 °C to about 400 °C.

9. The method of claim 4, wherein the ratio of acetaldehyde in the reductant stream and $NO_2$ from the first catalyst is about 0.5 to 4.

10. The method of claim 4, wherein the first catalyst comprises 2 wt. % Ru loaded on alumina.

11. The method of claim 4, wherein the first catalyst comprises 2 wt. % Pt loaded on alumina.

12. The method of claim 4, wherein the second catalyst include a zeolite selected from the group consisting of ZSM-57, MCM-68, ZSM-5B, Mordenite, Chabazite, ZSM-35, MCM-49, ZSM-11, ZSM-5C, MCM-22, USY, ZSM-48, Beta.

13. The method of claim 4, wherein the second catalyst comprises Beta loaded with potassium.

14. The method of claim 4, wherein the second catalyst comprises ZSM-5C loaded with potassium.

15. The method ~~according to anyone of the preceding claims~~ of claim 1, wherein the exhaust stream from the second catalyst includes a residual amount of NOx, the method further comprising recycling the exhaust stream with the residual amount of NOx to the first catalytic reactor.

~~16. The method according to anyone of the preceding claims in which the potassium-loaded zeolite of the second catalyst is prepared by permeating a potassium salt solution into the zeolite.~~

~~17. The method according to claim 16 in which zeolite with the permeated potassium-slat solution is calcined in air.~~

~~18. The method according to anyone of the preceding claims in which the potassium-loaded zeolite of the second catalyst has a potassium loading of 0.2% to 2% weight.~~

16. The method of claim 1, wherein the first catalytic reactor is located relative a refinery flue of the at least one refinery component to maintain the first catalytic reactor between 200 °C and 400 °C.

17. The method of claim 1, wherein the operating temperature of the first catalytic reactor is maintained between 200 °C and 400 °C by heating or cooling the exhaust stream.

18. The method of claim 1, wherein the exhaust stream is provided from at least one refinery component selected from the group consisting of a combustion furnace, a boiler, a heater turbine, and a fluid catalytic cracking unit.

19. A system for selective catalytic reduction of NOx comprising:

a conduit in fluid communication with a source of an exhaust stream from a combustion operation, the exhaust stream containing an amount of NO;

a first catalytic reactor in fluid communication with the conduit and the source of the redundant stream, the first catalytic reactor comprising a first catalyst selected from the group consisting of bulk $Co_3O_4$, Ru loaded on a metal oxide, and Pt loaded on a metal oxide;

an outlet in fluid communication with the first catalytic reactor to direct the NOx treated exhaust stream from the first catalytic reactor;

~~to~~ a second ~~catalytic reactor containing a~~ catalyst ~~comprising~~ including a ~~potassium-loaded~~ zeolite, the second catalyst in fluid communication with the first catalyst; and

a reductant feedline in fluid communication with the second ~~catalytic reactor~~ catalyst to introduce a reductant stream including a low molecular weight aldehyde to the second catalyst.

20. The system of claim 19, wherein the first catalytic reactor includes a

vessel, and the second catalyst is within the vessel of the first catalytic reactor.

21. The system of claim 19, wherein the second catalyst is in a second catalytic reactor located downstream of the first catalytic reactor.

22. The system ~~according to anyone of claims 19 to 21~~ of claim 19, wherein the low-molecular aldehyde is acetaldehyde.

23. The system ~~according to anyone of claims 19 to 21~~ of claim 19, wherein the first catalyst comprises 2 wt. % Ru loaded on alumina.

24. The system ~~according to anyone of claims 19 to 21~~ of claim 19, wherein the first catalyst comprises 2 wt. % Pt loaded on alumina.

25. The system ~~according to anyone of claims 19 to 21~~ of claim 19, wherein the second catalyst include a zeolite selected from the group consisting of ZSM-57, MCM-68, ZSM-5B, Mordenite, Chabazite, ZSM-35, MCM-49, ZSM-11, ZSM-5C, MCM-22, USY, ZSM-48, Beta.

26. The system of claim ~~25~~ 19, wherein the second catalyst comprises Beta loaded with potassium

27. The system of claim ~~25~~ 19, wherein the second catalyst comprises ZSM-5C loaded with potassium.

28. The system ~~according to anyone of claims 19 to 27~~ of claim 19, wherein the source of the exhaust stream is a refinery component selected from the group consisting of a combustion furnace, a boiler, a heater turbine, ~~or~~ and a fluid catalytic cracking unit.

29. The system of claim 28, wherein the first catalytic reactor is located downstream from a flue of the at least one refinery component to maintain the first catalytic reactor between about 200 °C and about 400 °C.

30. The system of claim 19, further comprising a heat exchanger operatively coupled to heat the exhaust stream to maintain the first catalytic reactor at a temperature of between about 200 °C and about 400 °C.