

Having thus described the invention, what I claim is:

1. A method for removing contaminants from a tail gas stream of a nitric acid production process wherein nitric acid is recovered from an absorber column comprising adding ozone to said absorber column, wherein nitrogen oxides are oxidized to form N_2O_5 .
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2. The method as claimed in claim 1 wherein said contaminants are selected from the group consisting of nitrogen oxides.
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3. The method as claimed in claim 1 wherein said absorber column is a multistage absorber column.
4. The method as claimed in claim 3 wherein said absorber column is a plate column having from 20 to 70 plates.
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5. The method as claimed in claim ~~4~~3 wherein said ozone contacts said nitrogen oxides in between said plates.
- 20 6. The method as claimed in claim 1 further comprising introducing oxygen into said absorber column.
7. The method as claimed in claim 1 wherein said ozone is introduced into a final stage of said absorber column.
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8. The method as claimed in claim 1 wherein said ozone is raised to the pressure of said absorber column.
9. A method for removing contaminants from a tail gas stream of a nitric acid production process wherein nitric acid is recovered from an absorber
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column comprising feeding a process gas stream and an enhanced oxygen-containing stream into an absorber column and adding ozone to said absorber column, wherein nitrogen oxides are oxidized to form N_2O_5 .

5 10. The method as claimed in claim 9 wherein said contaminants are selected from the group consisting of nitrogen oxides.

11. The method as claimed in claim 9 wherein said absorber column is a multistage absorber column.

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12. The method as claimed in claim 9 wherein said absorber column is a plate column having from 20 to 70 plates.

13. The method as claimed in claim 12 wherein said ozone contacts said
15 nitrogen oxides in between said plates.

14. The method as claimed in claim 9 further comprising introducing oxygen into said absorber column.

20 15. The method as claimed in claim 14 wherein said ozone is introduced into a final stage of said absorber column.

16. The method as claimed in claim 9 wherein said ozone is raised to the pressure of said absorber column.

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17. The method as claimed in claim 16 wherein said absorber column is a series of packed absorber columns.

18. The method as claimed in claim 17 wherein ozone is added to a final
30 packed absorber column in said series of packed absorber columns.

19. A method for producing nitric acid comprising the steps of:

a) reacting ammonia in an ammonia converter;

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b) feeding reaction products from step a) to a waste heat recovery unit;

c) feeding the reaction products from step b) to a heat exchanger thereby heating said reaction products;

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d) feeding the reaction products of step c) to a cooler condenser thereby cooling said reaction products;

e) feeding the cooled reaction products of step d) to an absorber column wherein nitric acid is separated from a tail gas; and

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f) feeding ozone to said absorber column to react with contaminants in said tail gas.

20. The method as claimed in claim 19 wherein said contaminants are selected from the group consisting of nitrogen oxides.

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21. The method as claimed in claim 19 wherein said absorber column is a multistage absorber column.

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22. The method as claimed in claim 21 wherein said absorber column is a plate column having from 20 to 70 plates.

23. The method as claimed in claim 21 wherein said ozone contacts said nitrogen oxides in between said plates.

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24. The method as claimed in claim 19 further comprising introducing oxygen into said absorber column.

5 25. The method as claimed in claim 19 wherein said ozone is introduced into a final stage of said absorber column.

26. The method as claimed in claim 19 wherein said ozone is raised to the pressure of said absorber column.

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27. A method for removing contaminants from a gas stream from an industrial process comprising the steps:

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a) mixing said gas stream with a stoichiometric excess amount of oxygen;

b) feeding said gas stream mixture to a first packed column;

c) contacting said gas stream mixture with an aqueous nitric acid solution;

20 d) feeding the gas stream mixture of step c) to a second packed column and contacting with an aqueous nitric acid solution;

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e) contacting said gas stream mixture in said second packed column with ozone, wherein nitrogen oxides are oxidized to form N_2O_5 ; and

f) recovering said gas stream.

28. The method as claimed in claim 27 wherein said industrial process is selected from the group consisting of nitric acid oxidation of organic material
30 and processing of substances with nitric acid.

29. The method as claimed in claim 27 wherein said contaminants are selected from the group consisting of nitrogen oxides.

5 30. The method as claimed in claim 27 wherein said nitric acid in said second packed column has a lower concentration than said nitric acid in said first packed column.

10 31. The method as claimed in claim 27 wherein two to six packed columns are used.

15 32. The method as claimed in claim 27 wherein a sump in said first packed column is replenished with aqueous nitric acid from said second packed column.

33. The method as claimed in claim 27 wherein a sump in said second packed column is replenished with process feed water.

20 34. The method as claimed in claim 27 wherein said packed column are in series.

35. The method as claimed in claim 34 wherein said packed columns are stacked vertically.