Claims

1. A method for the catalytic removal of carbon dioxide and NO_x from waste gases in a reactor charged with activated carbon catalyst, said method ~~being characterised by~~ comprising the following steps:

   a. saturating the catalyst with water

   b. saturating or partially saturating the waste gases with water,

   c. introducing the saturated or partially saturated waste gases into the reactor containing the catalyst saturated with water,

   d. catalytically converting NO_x into NO_2^-/NO_3^- and, in parallel with this, catalytically converting CO_2 into carbon and O_2 on the same catalyst,

   e. continuously washing out the activated carbon catalyst with water and

   discharging the carbon as a solid and NO_2^-/NO_3^- dissolved in water.

2. A method according to claim 1, ~~characterised in that~~wherein saturation or partial saturation of the activated carbon catalyst with NO_x by 0.1 to 0.3 kg NO_x/m^3 of activated carbon catalyst proceeds before the waste gases are conveyed into the reactor.

3. A method according to any one of the preceding claims, ~~characterised in that~~ wherein C_xH_y is removed from the waste gases at the same time as the CO_2 and NO_x.

4. A method according to any one of claims 1-3, ~~characterised in that~~ wherein the activated carbon catalyst is an activated carbon granulate with a particle size of 1-3 mm, 2-4 mm or 3-5 mm produced by steam activation and having the following general properties: iodine number 800; methylene blue adsorption 11 g/100 g; inner surface area (BET) 875 m^2/g; bulk density 260 kg/m^3; density after back-wash 230 kg/m^3; uniformity factor 1.3 – ash content 7 % by weight; pH alkaline; moisture (packed) 2 % by weight.

5. A method according to any one of the preceding claims, ~~characterised in that~~ wherein the waste gases are passed prior to step b) into a prereactor containing a second catalyst and then saturated or partially saturated with water in stepb).

6. A method according to claim 7, ~~characterised in that~~ wherein the second catalyst is an extruded activated carbon granulate with a particle size of 3 mm with the following general properties: butane absorption at p/p0=0.1: 24 g/100 g; inner surface area (BET) 1200 m2/g; bulk density 400 kg/m3; hardness (ballpan hardness): 98, moisture (packed) 5 % by weight, decomposition time max.: 15 min, min.: 8 min.

7. A method according to any one of claims 1-6, ~~characterised in that~~ wherein the waste gases are passed after step b) into a prereactor containing a second catalyst and then introduced into the reactor in step c).

8. A method according to claim 5, 6 or 7, ~~characterised in that~~ wherein the second catalyst is used in the dry state in the prereactor.

9. A method according to any one of the preceding claims, ~~characterised in that~~ wherein there are added to the water in steps a), b) and/or e):

   • a base Mn+(OH")n, M being selected from the groups consisting of alkali metals and alkaline earth metals and n being 1, 2 or 3 and/or,

   • an ionic, anionic, amphoteric or nonionic surfactant or mixtures thereof.

10. A method according to any one of the preceding claims, ~~characterised in that~~ wherein the waste gases contain between 100 and 1500 ppm of NOx and between 0.3 and 15 % by volume of CO2.

11. A method according to any one of claims 3 to 10, ~~characterised in that~~ wherein the waste gases contain between 0 and 700 ppm of CxHy.

12. A method according to any one of the preceding claims, ~~characterised in that~~ wherein the inlet temperature of the waste gases in the reactor lies between ambient temperature and 150 °C.

13. A method according to any one of the preceding claims, ~~characterised in that~~ wherein the oxygen content of the waste gases is at least 5 % by volume, preferably at least 8 % by volume, particularly preferably at least 10 % by volume, and in particular at least 12 % by volume.

14. A method according to any one of the preceding claims, ~~characterised in that~~ wherein O_2 is discharged during the method.