Claims

[Claim 1]

An N_2O analysis device comprising:

light emission means for emitting laser light to flue gas containing N_2O, H_2O, and CO_2,the flue gas being at normal pressures and being not treated with anyone of a dust removal and a dehumidification and a pressure reduction;

light reception means for receiving the laser light emitted to the flue gas;

wavelength control means for performing control such that a wavelength of the laser light emitted by the light emission means is in a 3.84 to 4.00 μm band; and

N_2O concentration calculation means for calculating a concentration of N_2O by means of infrared spectroscopy, using the laser light received by the light reception means and the laser light controlled by the wavelength control means.

[Claims 2]

The N_2O analysis device according to claim 1, wherein

the wavelength control means performs control such that the wavelength of the laser light is 3.9034 to 3.9060 μm, 3.9090 to 3.9116 μm, or 3.9122 to 3.9148 μm.

[Claim 3]

The N_2O analysis device according to claim 1 or 2, wherein

the wavelength control means performs control such that the wavelength of the laser light is 3.9047 μm, 3.9103 μm, or 3.9135 μm.

[Claim 4]

The N_2O analysis device according to any one of claims 1 to 3, wherein

the light emission means includes a nonlinear optical crystal, generates, by means of difference frequency generation using inputs of laser light with a wavelength of λ_1 and laser light with a wavelength of λ_2, laser light with a wavelength

of λ_3 satisfying $1/\lambda_3 = 1/\lambda_1 - 1/\lambda_2$, and outputs the laser light with the wavelength of λ_3.

[Claim 5]

The N_2O analysis device according to any one of claims 1 to 4, further comprising

temperature measurement means for measuring a temperature of the flue gas, wherein

the N_2O concentration calculation means calculates the concentration of N_2O by means of the infrared spectroscopy, using also the temperature of the flue gas measured by the temperature measurement means.

[Claim 6]

The N_2O analysis device according to any one of claims 1 to 5, further comprising

sampling means for sampling the flue gas, wherein

the light emission means emits the laser light to the flue gas sampled by the sampling means.

[Claim 7]

The N_2O analysis device according to claim 6, further comprising

heating means for heating the flue gas sampled by the sampling means.

[Claim 8]

An N_2O analysis method comprising:

emitting, by light emission means, laser light with a wavelength of 3.84 to 4.00 μm to flue gas containing N_2O, H_2O, and CO_2, the flue gas being at normal pressures and being not treated with anyone of a dust removal and a dehumidification and a pressure reduction;

receiving the laser light emitted to the flue gas; and

calculating a concentration of N_2O by means of infrared spectroscopy, using the received laser light and the laser light which is controlled to be 3.84 to 4.00 μm.

[Claim 9]

The N_2O analysis method according to claim 8, wherein

the wavelength of the laser light emitted by the light emission means is controlled to be 3.9034 to 3.9060 μm, 3.9090 to 3.9116 μm, or 3.9122 to 3.9148 μm.

[Claim 10]

The N_2O analysis method according to claim 8 or 9, wherein

the wavelength of the laser light emitted by the light emission means is controlled to be 3.9047 μm, 3.9103 μm, 3.9135μm.

[Claim 11]

The N_2O analysis method according to any one of claims 8 to 10, wherein

equipment including a nonlinear optical crystal is used for the light emission means, the equipment generating, by means of difference frequency generation using inputs of laser light with a wavelength of λ_1 and laser light with a wavelength of λ_2, laser light with a wavelength of λ_3 satisfying $1/\lambda_3 = 1/\lambda_1 - 1/\lambda_2$, and outputting the laser light with the wavelength of λ_3.

[Claim 12]

The N_2O analysis method according to any one of claims 8 to 11, further comprising:

measuring a temperature of the flue gas; and

calculating the concentration of N_2O by means of the infrared spectroscopy, using also the measured temperature of the flue gas.

[Claim 13]

The N_2O analysis method according to any one of claims 8 to 12, wherein the flue gas to which the laser light is emitted is sampled.

[Claim 14]

The N_2O analysis method according to claim 13, wherein the sampled flue gas is heated.