

EXHAUST GAS TREATMENT SYSTEM AND EXHAUST GAS TREATMENT METHOD

TECHNICAL FIELD

[0001]

The present invention relates to an exhaust gas treatment system and an exhaust gas treatment method, and more particularly relates to an exhaust gas treatment system and an exhaust gas treatment method capable of, on the premise of an exhaust gas treatment system treating acid gas contained in exhaust gas generated by an incineration process of waste with an acid gas treatment agent, sufficiently treating the acid gas and further reducing treatment cost and environmental impact caused by addition of an excess acid gas treatment agent used in the treatment.

BACKGROUND ART

[0002]

Exhaust gas generated by incineration of waste is an acid gas containing hydrogen chloride and sulfur oxide. Conventionally, such exhaust gas is treated with an acid gas treatment agent such as slaked lime or sodium bicarbonate, and thereafter, fly ash that is a solid matter is removed by a dust collector such as a bag filter, and then discharged from a chimney.

[0003]

Incidentally, objects to be incinerated, such as municipal waste and industrial waste, may differ greatly in properties. Therefore, the concentration of the acid gas in the exhaust gas generated by incineration varies greatly for each object to be incinerated, and accordingly, the

addition amount of the acid gas treatment agent necessary for appropriately treating the exhaust gas tends to vary greatly. An excessive amount of the treatment agent has been added to the exhaust gas to treat the exhaust gas in anticipation of such variation in the concentration of the acid gas in the exhaust gas which differs for each object to be incinerated.

[0004]

However, when such an excessive amount of the acid gas treatment agent is added, the cost of the acid gas treatment agent increases, the acid gas treatment agent remaining unused in the treatment of the acid gas is collected together with fly ash, thereby increasing the amount of fly ash landfilled, and a usage amount of a fly ash treatment agent added to immobilize and remove heavy metals contained in the fly ash also increases, so that not only the cost of the acid gas treatment agent but also the cost of further treatment of the fly ash and the environment impact tend to increase. Therefore, various methods for appropriately controlling the addition amount of the acid gas treatment agent are being studied.

[0005]

For example, Patent Document 1 proposes a method for estimating the minimum required amount of an acid gas treatment agent by combining feed-forward control for determining an addition amount of an alkali agent on the basis of an acid gas concentration at an inlet and feedback control for compensating an addition amount of an alkali agent on the basis of an acid gas concentration after treatment with the alkali agent.

CITATION LIST

PATENT DOCUMENT

[0006]

Patent Document 1: Japanese Unexamined Patent Application,
Publication No. 10-165752

SUMMARY

[0007]

In the method for estimating the minimum required amount of the acid gas treatment agent and adding the acid gas treatment agent as typified by the treatment method described in Patent Document 1, it is theoretically possible to stably perform the acid gas treatment without excessive addition of the acid gas treatment agent. However, at the actual treatment site, an operator of the exhaust gas treatment system adds an excess amount of acid gas treatment agent to the estimated minimum required amount of acid gas treatment agent on the basis of his or her experience in order to prevent the acid gas from being unable to be sufficiently treated due to a measurement delay of measuring equipment (a delay caused by a sampling point of an analyzer being located at a later stage than a chemical injection point) or the like, which is the premise of a rapid property change of the acid gas and control.

[0008]

Therefore, in such a method, it has still been impossible to sufficiently reduce the excess amount of the acid gas treatment agent, and there has still been room for improvement for sufficiently treating the acid gas and further reducing the treatment cost and environment

impact caused by the addition of the excess acid gas treatment agent used in the treatment.

[0009]

The present disclosure has been made in view of the above circumstances, and it is an object of the present disclosure to provide, on the premise of an exhaust gas treatment system treating acid gas contained in exhaust gas generated by an incineration process of waste with an acid gas treatment agent, an exhaust gas treatment system capable of sufficiently treating the acid gas and further reducing the treatment cost and environment impact caused by addition of an excess acid gas treatment agent used in the treatment.

[0010]

For achieving the above object, the present inventors have carried out intensive research. As a result, it has been found that in an exhaust gas treatment system including: an exhaust gas treatment unit that treats acid gas contained in exhaust gas; a treatment agent supply unit that supplies an acid gas treatment agent to the exhaust gas treatment unit; a post-treatment exhaust gas analysis unit that measures a post-treatment acid gas concentration (C1), the post-treatment acid gas concentration (C1) being a concentration of the acid gas contained in the exhaust gas after the treatment by the exhaust gas treatment unit; and a treatment agent addition management unit that calculates an addition amount of the acid gas treatment agent with which the post-treatment acid gas concentration (C1) measured by the post-treatment exhaust gas analysis unit is always equal to or less than a predetermined managed

concentration (C2) and instructs the treatment agent supply unit to supply the acid gas treatment agent in the calculated addition amount to the exhaust gas treatment unit, the exhaust gas treatment system further includes: an incineration object supply amount measurement unit that is located upstream of the exhaust gas treatment unit and measures a supply amount of an incineration object; a treatment agent supply amount measurement unit that measures a supply amount of the acid gas treatment agent supplied from the treatment agent supply unit; and a server unit that gathers and analyzes information data from at least the post-treatment exhaust gas analysis unit, the treatment agent supply amount measurement unit, and the incineration object supply amount measurement unit and determines whether the post-treatment acid gas concentration is proper in relation to the managed concentration (C2) from a result of the analysis, and hence it is determined whether the addition amount of the acid gas treatment agent is proper in relation to the managed concentration (C2), whereby the acid gas can be sufficiently treated, and the treatment cost and environment impact caused by addition of an excess acid gas treatment agent used in the treatment can further be reduced, thus leading to the completion of the present disclosure. Specifically, the present disclosure provides the following:

[0011]

(1) In a first aspect, an exhaust gas treatment system including: an exhaust gas treatment unit that treats acid gas contained in exhaust gas; a treatment agent supply unit that supplies an acid gas treatment agent to the exhaust gas treatment unit; a post-treatment exhaust gas analysis unit that measures a post-treatment acid gas concentration (C1), the

post-treatment acid gas concentration (C1) being a concentration of the acid

gas contained in the exhaust gas after the treatment by the exhaust gas treatment unit; and a treatment agent addition management unit that calculates an addition amount of the acid gas treatment agent with which the post-treatment acid gas concentration (C1) measured by the post-treatment exhaust gas analysis unit is always equal to or less than a predetermined managed concentration (C2) and instructs the treatment agent supply unit to supply the acid gas treatment agent in the calculated addition amount to the exhaust gas treatment unit, the exhaust gas treatment system further including: an incineration object supply amount measurement unit that is located upstream of the exhaust gas treatment unit and measures a supply amount of an incineration object; a treatment agent supply amount measurement unit that measures a supply amount of the acid gas treatment agent supplied from the treatment agent supply unit; and a server unit that gathers and analyzes information data from at least the post-treatment exhaust gas analysis unit, the treatment agent supply amount measurement unit, and the incineration object supply amount measurement unit and, based on a result of the analysis, determines whether the post-treatment acid gas concentration (C1) is proper in relation to the managed concentration (C2) by calculating an average deviation concentration range ($C2 - C1$) of the post-treatment acid gas concentration (C1) from the managed concentration (C2) or an excessive-addition cost of the acid gas treatment agent on a basis of the average deviation concentration range ($C2 - C1$) to determine whether the average deviation concentration range ($C2 - C1$) or the excessive-addition cost of the acid gas treatment agent is within a threshold, and, only when the average deviation concentration range ($C2 - C1$) or the excessive-addition cost of the acid gas treatment

agent exceeds a threshold and it is determined as not proper in the relation therebetween, makes a determination to reduce the addition amount of the acid gas treatment agent such that the average deviation concentration range ($C2 - C1$) becomes a positive value and narrow, wherein the addition amount of the acid gas treatment agent to be calculated by the treatment agent addition management unit is an amount prepared by adding a predetermined excessive amount as a safe amount to a minimum addition amount required for treating the acid gas at the exhaust gas treatment unit.

[0012]

(2) The exhaust gas treatment system according to (1) above, in which the server unit further includes information data on a unit price for the acid gas treatment agent and a unit price for incineration object disposal.

[0013]

(3) The exhaust gas treatment system according to (1) or (2) above further including, upstream of the exhaust gas treatment unit, a pre-

treatment exhaust gas analysis unit that measures an exhaust gas amount and a pre-treatment acid gas concentration prior to the treatment by the exhaust gas treatment unit, the pre-treatment acid gas concentration being a concentration of the acid gas contained in the exhaust gas, and the server unit further includes information data from the pre-treatment exhaust gas analysis unit.

[0014]

(4) The exhaust gas treatment system according to (1), (2) or (3) above further including, downstream of the exhaust gas treatment unit: a fly ash collection unit; a treatment temperature measurement unit that measures a treatment temperature at any position from the exhaust gas treatment unit to the fly ash collection unit; and a fly ash analysis unit that analyzes alkalinity of fly ash treated by the fly ash collection unit, and the server unit further includes information data from the treatment temperature measurement unit and the fly ash analysis unit.

[0015]

[0016]

(5) The exhaust gas treatment system according to any one of (1) to (4) above, in which the treatment agent addition management unit further has a function of notifying a person in charge of the exhaust gas treatment system or a person concerned such as a treatment agent supplier of the excessive-addition cost over a certain period.

[0017]

(6) The exhaust gas treatment system according to any one of (1) to (5) above, in which the server unit further has a function of collecting information data on the post-treatment acid gas concentration (C1) and the managed concentration (C2), recording the information data over time, and notifying a person in charge of the exhaust gas treatment system or a person concerned such as a treatment agent supplier of the information data.

[0018]

(7) In a second aspect, an exhaust gas treatment method including the steps of: treating, by an exhaust gas treatment unit, acid gas contained in exhaust gas; supplying, by a treatment agent supply unit, an acid gas treatment agent to the exhaust gas treatment unit; measuring, by a post-treatment exhaust gas analysis unit, a post-treatment acid gas concentration (C1), the post-treatment acid gas concentration (C1) being a concentration of the acid gas contained in the exhaust gas after the treatment by the exhaust gas treatment unit; and calculating, by a treatment agent addition management unit, an addition amount of the acid gas treatment agent with which the post-treatment acid gas concentration (C1) measured by the post-treatment exhaust gas analysis unit is always equal to or less than a predetermined managed

concentration (C2) and instructing the treatment agent supply unit to supply the acid gas

treatment agent in the calculated addition amount to the exhaust gas treatment unit, the exhaust gas treatment method further including the steps of: measuring a supply amount of an incineration object by an incineration object supply amount measurement unit located upstream of the exhaust gas treatment unit; measuring, by a treatment agent supply amount measurement unit, a supply amount of the acid gas treatment agent supplied from the treatment agent supply unit; and gathering and analyzing, by a server unit, information data from at least the post-treatment exhaust gas analysis unit, the treatment agent supply amount measurement unit, and the incineration object supply amount measurement unit and, based on a result of the analysis, determining whether the post-treatment acid gas concentration (C_1) is proper in relation to the managed concentration (C_2) by calculating an average deviation concentration range ($C_2 - C_1$) of the post-treatment acid gas concentration (C_1) from the managed concentration (C_2) or an excessive-addition cost of the acid gas treatment agent on a basis of the average deviation concentration range ($C_2 - C_1$) to determine whether the average deviation concentration range ($C_2 - C_1$) or the excessive-addition cost of the acid gas treatment agent is within a threshold, and, only when the average deviation concentration range ($C_2 - C_1$) or the excessive-addition cost of the acid gas treatment agent exceeds a threshold and it is determined as not proper in the relation therebetween, making a determination to reduce the addition amount of the acid gas treatment agent such that the average deviation concentration range ($C_2 - C_1$) becomes a positive value and narrow, wherein the addition amount of the acid gas treatment agent to be calculated by the treatment agent addition management unit is an

amount prepared by adding a predetermined excessive amount as a safe amount to a minimum addition amount required for treating the acid gas at the exhaust gas treatment unit.

[0019]

[0020]

According to the present disclosure, in an exhaust gas treatment system including: an exhaust gas treatment unit that treats acid gas contained in exhaust gas; a treatment agent supply unit that supplies to the exhaust gas treatment unit; a post-treatment exhaust gas analysis unit that measures a post-treatment acid gas concentration (C1), the post-treatment acid gas concentration (C1) being a concentration of the acid gas contained in the exhaust gas after the treatment by the exhaust gas treatment unit; and a treatment agent addition management unit that calculates an addition amount of the acid gas treatment agent with which the post-treatment acid gas concentration (C1) measured by the post-treatment exhaust gas analysis unit is always equal to or less than a predetermined managed concentration (C2) and instructs the treatment agent supply unit to supply the acid gas treatment agent in the calculated addition amount to the exhaust gas treatment unit, the exhaust gas treatment system further includes: an incineration object supply amount measurement unit that is located upstream of the exhaust gas treatment unit and measures a supply amount of an incineration object; a treatment agent supply amount measurement unit that measures a supply amount of the acid gas treatment agent supplied from at least the treatment agent supply unit; and a server unit that gathers and analyzes information data from the post-treatment exhaust gas analysis unit, the treatment agent supply amount measurement unit, and the incineration object supply amount measurement unit and determines whether the post-treatment acid gas concentration (C1) is proper in relation to the managed concentration (C2) from a result of the analysis, and hence it is determined whether the addition amount of the acid gas treatment agent is proper in relation to the managed concentration (C2), whereby it is

possible to sufficiently treat the acid gas and to further reduce the treatment cost and environment impact caused by addition of an excess acid gas treatment agent used in the treatment.

BRIEF DESCRIPTION OF THE DRAWING

[0021]

Figure 1 is a schematic flow diagram of a construction example of an exhaust gas treatment system according to the present embodiment.

PREFERRED MODE FOR CARRYING OUT THE INVENTION

[0022]

Hereinafter, a specific embodiment of the present invention will be described in detail, but the present invention is not limited to the following embodiment and can be implemented with appropriate modifications within the scope of the object of the present invention.

[0023]

<Exhaust Gas Treatment System>

An exhaust gas treatment system according to the present embodiment is an exhaust gas treatment system including: an exhaust gas treatment unit that treats acid gas contained in exhaust gas; a treatment agent supply unit that supplies an acid gas treatment agent to the exhaust gas treatment unit; a post-treatment exhaust gas analysis unit that measures a post-treatment acid gas concentration (C1), the post-treatment acid gas concentration (C1) being a concentration of the acid gas contained in the exhaust gas after the treatment by the exhaust gas treatment unit; and a treatment agent addition management unit that calculates an addition amount of the acid gas treatment agent with

which the post-treatment acid gas concentration (C1) measured by the post-treatment exhaust gas analysis unit is always equal to or less than a predetermined managed concentration (C2) and instructs the treatment agent supply unit to supply the acid gas treatment agent in the calculated addition amount to the exhaust gas treatment unit. The exhaust gas treatment system further includes: an incineration object supply amount measurement unit that is located upstream of the exhaust gas treatment unit and measures a supply amount of an incineration object; a treatment agent supply amount measurement unit that measures a supply amount of the acid gas treatment agent supplied from the treatment agent supply unit; and a server unit that gathers and analyzes information data from at least the post-treatment exhaust gas analysis unit, the treatment agent supply amount measurement unit, and the incineration object supply amount measurement unit and determines whether the post-treatment acid gas concentration (C1) is proper in relation to the managed concentration (C2) from a result of the analysis.

[0024]

Hereinafter, an example of the exhaust gas treatment system will be described in detail with reference to the drawing. Figure 1 is a schematic flow diagram illustrating a construction example of an exhaust gas treatment system according to the present embodiment. In Figure 1, among lines connecting blocks, a solid line represents a flow of an object, and a dot-and-chain line represents a flow of information.

[0025]

Further, in the present specification, the term "acid gas" refers to a gas that is dissolved in a solution and exhibits acidity (particularly,

strong acidity) and refers to, for example, a gas such as hydrogen chloride or hydrogen sulfide.

[0026]

An exhaust gas treatment system 1 is a system for treating exhaust gas generated from an incineration object at the time of incineration in an incinerator F, is formed mainly of an exhaust gas treatment unit 12, a treatment agent supply unit 14, a post-treatment exhaust gas analysis unit 20, and a treatment agent addition management unit 21, and further includes an incineration object supply amount measurement unit 10, a treatment agent supply amount measurement unit 15, and a server unit 22. The exhaust gas treatment system 1 also includes a treatment agent storage unit 13, a pre-treatment exhaust gas analysis unit 11, a fly ash collection unit 16, a treatment temperature measurement unit 17, a fly ash storage unit 18, and a fly ash analysis unit 19.

[0027]

An incineration object (waste) to be incinerated in the incinerator F is incinerated inside the incinerator F after its supply amount is measured in the incineration object supply amount measurement unit 10. By such incineration, the exhaust gas generated in the incinerator F is cooled by way of a boiler and a temperature reducing tower (neither is illustrated) and then transferred to the pre-treatment exhaust gas analysis unit 11. For example, the exhaust gas amount and the pre-treatment acid gas concentration, which is the concentration of acid gas contained in the exhaust gas, are analyzed in the pre-treatment exhaust gas analysis unit 11, and thereafter, the exhaust gas is transferred to the exhaust gas treatment unit 12.

[0028]

Meanwhile, the acid gas treatment agent used for treating the exhaust gas is stored in the treatment agent storage unit 13 and is transferred to the exhaust gas treatment unit 12 through the treatment agent supply unit 14. At this time, in the treatment agent supply amount measurement unit 15 provided downstream (in the flow of the treatment agent) of the treatment agent supply unit 14, the supply amount of the treatment agent is measured.

[0029]

As described above, the exhaust gas containing the acid gas and the acid gas treatment agent for treating the acid gas are mixed in the exhaust gas treatment unit 12, and a reaction therebetween starts. Such a mixture is then transferred from the exhaust gas treatment unit 12 to the fly ash collection unit 16. Although the details will be described later, the fly ash collection unit 16 collects a solid component, that is, a mixture mainly of fly ash and an untreated acid gas treatment agent, from the mixture of the acid gas and the acid gas treatment agent by using a filter film (e.g., bag filter, etc.). Thus, the acid gas treatment agent exists on the surface of such a filter film to a certain extent, and hence the acid gas is finally treated on the surface of the filter film of the fly ash collection unit 16 and neutralized. Then, the treatment temperature measurement unit 17 measures the temperature of the exhaust gas (hereinafter also referred to as "treatment temperature") in the vicinity of the fly ash collection unit 16.

[0030]

The mixture of the fly ash and the untreated acid gas treatment agent collected by the fly ash collection unit 16 is temporarily stored into the fly ash storage unit 18 for the subsequent heavy metal immobilization

process. The fly ash analysis unit 19 collects a part of the mixture and analyzes its alkalinity and the like.

[0031]

On the other hand, the exhaust gas having passed through the fly ash collection unit 16 is applied to a denitration catalyst (not illustrated), and then the concentration of the acid gas contained in the exhaust gas is measured in the post-treatment exhaust gas analysis unit 20. When the concentration of the acid gas has been sufficiently reduced, the exhaust gas is discharged into the atmosphere.

[0032]

As described above, at the time of treating the acid gas contained in the exhaust gas, the treatment agent addition management unit collects at least the acid gas concentration measured in the post-treatment exhaust gas analysis unit 20, calculates, on the basis of the value of the acid gas concentration, the addition amount of the acid gas treatment agent such that the addition amount of the acid gas treatment agent is always equal to or less than a predetermined managed concentration (C2), and instructs the treatment agent supply unit 14 to supply the acid gas treatment agent in the calculated addition amount to the exhaust gas treatment unit 12 to perform feedback control.

[0033]

Further, at the time of treating such acid gas, the server unit 22 gathers and analyzes at least information data on the post-treatment acid gas concentration (C1) in the post-treatment exhaust gas analysis unit 20, information data on the supply amount of the acid gas treatment agent in the treatment agent supply amount measurement unit 15, and information data on the supply amount of the incineration object in the

incineration object supply amount measurement unit 10, and determines whether the post-treatment acid gas concentration (C1) is proper in relation to the managed concentration (C2) from a result of the analysis.
[0034]

As described above, by determining whether the post-treatment acid gas concentration (C1) is proper in relation to the managed concentration (C2) from the result of the analysis, an operator of the exhaust gas treatment system 1 can recognize the excessive addition of the acid gas treatment agent, is thus given an opportunity to consider reducing the addition amount of the acid gas treatment agent, and can prevent the excessive addition of the acid gas treatment agent.
[0035]

Hereinafter, each constituent element of the exhaust gas treatment system 1 will be described in detail.
[0036]

[Incineration object supply amount measurement unit]

The incineration object supply amount measurement unit 10 is located upstream of the exhaust gas treatment unit 12 and measures the supply amount of the incineration object. The incineration object supply amount measurement unit 10 is connected to the treatment agent addition management unit 21 and the server unit 22 in a state where at least information data can be transmitted. The incineration object supply amount measurement unit 10 transmits information data to the information data treatment agent addition management unit 21 and the server unit 22, and the information data is used here to determine the addition amount of the acid gas treatment agent in the treatment agent addition management unit 21 and to determine whether or not the post-

treatment acid gas concentration (C1) in the server unit 22 is appropriate, so that the accuracy of such determination can be further enhanced.

[0037]

The incineration object supply amount measurement unit 10 is not particularly limited so long as the amount of the incineration object, such as the weight or volume of the incineration object, can be quantitatively measured, but for example, a weight meter or the like can be used. As an example, a crane used for throwing an incineration object into the incinerator is provided with a weight meter on its arm and can measure the weight of the incineration object gripped by the arm and thrown into the incinerator. By cumulatively storing the information on the weight, it is possible to measure the supply amount of the incineration object.

[0038]

In Figure 1, the incineration object supply amount measurement unit 10 is disposed upstream (in the flow of incineration object and exhaust gas) of the incinerator F, but the incineration object supply amount measurement unit 10 may only be located upstream of the exhaust gas treatment unit 12 and may be provided inside the incinerator F, for example.

[0039]

[Exhaust gas treatment unit]

The exhaust gas treatment unit 12 treats acid gas contained in the exhaust gas. As described above, the exhaust gas is an acid gas containing hydrogen chloride or sulfur oxide, so that prior to the discharge into the atmosphere, it is necessary to prevent harmful gas from being discharged to the environment by neutralizing the acid gas. Therefore, in the exhaust gas treatment unit 12, the acid gas treatment

agent is added to the acid gas contained in the exhaust gas for neutralization.

[0040]

Although the details will be described later, for example, an alkaline agent is used as the acid gas treatment agent. Such an acid gas treatment agent is brought into contact with the exhaust gas to be able to neutralize the acid gas contained in the contacted exhaust gas.

[0041]

The exhaust gas treatment unit 12 is not particularly limited so long as the exhaust gas and the treatment agent, which is a solid, can be brought into contact and reacted, and for example, a part of a flue (gas flow path) or the like can be used as the exhaust gas treatment unit. Specifically, as the flue, a part of a transfer pipe or the like for transferring gas to a dust collector, such as a bag filter, at the later stage may be used (hereinafter, particularly, the flue as the exhaust gas treatment unit 11 may be referred to as a "reaction pipe"). Further, the exhaust gas treatment unit 11 may be formed of a closed vessel additionally provided in the flue (gas flow path), various reaction vessels, or the like. For convenience, these reaction gaps are referred to as the "exhaust gas treatment unit," but as described above, the actual neutralization reaction can also occur in the fly ash collection unit 16.

[0042]

Note that the generation source and the component of the exhaust gas are not particularly limited so long as the exhaust gas contains acid gas, and for example, exhaust gas generated by the incineration of various wastes can be used.

[0043]

The exhaust gas treatment can be performed in a continuous mode. The treatment may be performed in a batch mode by using, for example, a closed vessel or various reaction vessels for gas-phase reaction. In any case, the treatment amount of the exhaust gas is not particularly limited and may be appropriately designed in consideration of the amount of the exhaust gas generated by the incineration of waste, or the like.

[0044]

[Treatment agent storage unit]

Although not an essential constituent element of the present invention, the treatment agent storage unit 13 is for storing the acid gas treatment agent to be supplied to the exhaust gas treatment unit 12.

[0045]

The treatment agent storage unit 13 is not particularly limited so long as the treatment agent can be stored, but for example, a storage tank or silo can be used.

[0046]

The storage capacity and shape of the treatment agent storage unit 13 are not particularly limited and can be appropriately designed in consideration of the installation space thereof, the operation plan for the exhaust gas treatment, the treatment amount of the exhaust gas, the frequency of the exhaust gas treatment, the frequency of the order of the treatment agent, and the like.

[0047]

[Treatment Agent Supply Unit]

The treatment agent supply unit 14 receives an instruction from the treatment agent addition management unit 21 to be described later

and supplies, to the exhaust gas treatment unit 12, an acid gas treatment agent stored in the treatment agent storage unit 13, for example.

[0048]

The treatment agent supply unit 14 may only have a configuration to be able to supply a predetermined amount of the acid gas treatment agent from the treatment agent storage unit 13 to the exhaust gas treatment unit 12 and is not particularly limited, but the treatment agent supply unit 14 may be formed of, for example, a quantitative feeder, a pump, or a powder supply unit.

[0049]

(Acid gas treatment agent)

The acid gas treatment agent has a characteristic (alkaline properties) of neutralizing acid gas in exhaust gas. The acid gas treatment agent is not particularly limited and may be in a liquid state or in a powder state (solid state), and the acid gas treatment agent needs to have a component, the addition amount of which can be calculated by analyzing the amount of acid gas to be treated.

[0050]

The acid gas treatment agent is not particularly limited, and for example, calcium hydroxide, calcium oxide, calcium carbonate, magnesium hydroxide, magnesium oxide, magnesium carbonate, calcium hydroxide-magnesium hydroxide, calcium oxide-magnesium oxide, calcium carbonate-magnesium carbonate, sodium hydroxide, sodium hydrogen carbonate, sodium carbonate, and the like can be used. The treatment agent may be used alone or in combination of two or more thereof.

[0051]

When a powdery agent is used as the acid gas treatment agent, the average particle size thereof is preferably 1 μm or more, more preferably 2 μm or more, and still more preferably 5 μm or more. Since the average particle size of the acid gas treatment agent is 1 μm or more, the powder does not scatter excessively and can be brought into contact with the acid gas appropriately. The average particle size of the acid gas treatment agent is preferably 50 μm or less, more preferably 40 μm or less, and still more preferably 30 μm or less. Since the average particle size of the acid gas treatment agent is 50 μm or less, it is possible to ensure the specific surface area of the acid gas treatment agent which is large enough for the acid gas to come into contact.

[0052]

Note that an instruction concerning the addition amount of the acid gas treatment agent transmitted from the treatment agent addition management unit 21 is transmitted to the treatment agent supply unit 14 such as a quantitative feeder provided upstream of the exhaust gas treatment unit 12, for example, and the treatment agent supply unit 14 can be operated on the basis of the instruction to add a predetermined amount of the acid gas treatment agent to the exhaust gas treatment unit 12.

[0053]

[Treatment agent supply amount measurement unit]

The treatment agent supply amount measurement unit 15 measures the supply amount of the acid gas treatment agent supplied from the treatment agent supply unit 14. The treatment agent supply amount measurement unit 15 is connected to the treatment agent addition management unit 21 and the server unit 22 in a state where at

least information data can be transmitted. The treatment agent supply amount measurement unit 15 transmits information data to the information data treatment agent addition management unit 21 and the server unit 22, and the information data is used here to determine the addition amount of the acid gas treatment agent in the treatment agent addition management unit 21 and to determine whether or not the post-treatment acid gas concentration (C1) in the server unit 22 is appropriate, so that the accuracy of such determination can be further enhanced.

[0054]

The treatment agent supply amount measurement unit 15 is not particularly limited so long as the supply amount of the acid gas treatment agent can be measured, and a weight meter can be used as an example. Alternatively, when a motor-type supply device is used as the treatment agent supply unit 14, the device may be formed of a recording/arithmetic device connected to an inverter for controlling the motor. Specifically, the relationship between the frequency (Hz) of the inverter and the supply amount (kg/h) of the acid gas treatment agent per hour (e.g., calibration curve) is obtained in advance, and the integrated supply amount of the acid gas treatment agent can be calculated from the integrated amount of the frequency when the inverter is actually operated. With such a configuration, the addition amount of the acid gas treatment agent can be determined more simply.

[0055]

[Fly ash collection unit]

Although not an essential constituent element of the present invention, the fly ash collection unit 16 is for separating and collecting a solid component, specifically, a mixture mainly of fly ash and an

unreacted acid gas treatment agent (hereinafter simply referred to as "fly ash" for convenience) from the exhaust gas treated in the exhaust gas treatment unit 12. According to the exhaust gas treatment system 1 of the present embodiment, the content of the acid gas treatment agent contained in the fly ash collected here and finally disposed can be reduced compared to the conventional exhaust gas treatment system.

[0056]

The fly ash collection unit 16 is not particularly limited so long as a gas contained in the exhaust gas can be separated from a solid component (fly ash) to collect the solid component, but for example, a bag filter or the like can be used.

[0057]

[Treatment temperature measurement unit]

Although not being an essential constituent element of the present invention, the treatment temperature measurement unit 17 measures the treatment temperature at any position in the fly ash collection unit 16 and from the exhaust gas treatment unit 12 to the fly ash collection unit 16 downstream of the exhaust gas treatment unit 12. There is a correlation between the treatment temperature and the required amount (the minimum addition amount to be described later) of the acid gas treatment agent. In Figure 1, the treatment temperature measurement unit 17 is provided in the fly ash collection unit 16, but the position of the treatment temperature measurement unit 17 may be in the exhaust gas treatment unit 12 or in a pipe between the exhaust gas treatment unit 12 and the fly ash collection unit 16. The treatment temperature measurement unit 17 is connected to the treatment agent addition management unit 21 and the server unit 22 in a state where at least

information data can be transmitted. The treatment temperature measurement unit 17 transmits information data to the information data treatment agent addition management unit 21 and the server unit 22, and the information data is used here to determine the addition amount of the acid gas treatment agent in the treatment agent addition management unit 21 and to determine whether or not the post-treatment acid gas concentration (C1) in the server unit 22 is appropriate, so that the accuracy of such determination can be further enhanced.

[0058]

The treatment temperature measurement unit 17 is not particularly limited so long as the temperature of the exhaust gas is measured, and a K-type thermocouple thermometer or the like can be used.

[0059]

[Fly ash storage unit]

Although not an essential constituent element of the present invention, the fly ash storage unit 18 is for temporarily storing the fly ash as a solid matter collected in the fly ash collection unit 16 so as to be subjected to subsequent fly ash treatment (immobilization of heavy metals).

[0060]

The fly ash storage unit 18 is not particularly limited so long as fly ash is stored, but for example, a storage tank or silo can be used.

[0061]

The storage capacity and shape of the fly ash storage unit 18 are not particularly limited and can be appropriately designed in consideration of the installation space thereof, the operation plan for the

exhaust gas treatment, the treatment amount of the exhaust gas, the frequency of the exhaust gas treatment, the amount of generated fly ash, the frequency of the fly ash treatment, and the like.

[0062]

Note that the fly ash stored in the fly ash storage unit 18 cannot be reused, and is landfilled after being subjected to necessary treatment such as detoxification treatment of heavy metals.

[0063]

[Fly ash analysis unit]

Although not an essential constituent element of the present invention, the fly ash analysis unit 19 is located downstream of the exhaust gas treatment unit 12 and analyzes the alkalinity of the fly ash collected by the fly ash collection unit 16.

[0064]

The fact that the fly ash after the treatment shows alkaline properties means that there is an acid gas treatment agent that is not used for the neutralization reaction with the acid gas to be treated even though added to the exhaust gas treatment unit 12. Hence the alkalinity of the fly ash after the treatment becomes an index of the excess amount of the alkali agent. Therefore, the information data on the alkalinity is transmitted to the server unit 22 to be described later, and the server unit 22 determines whether the post-treatment acid gas concentration (C1) is proper in relation to the managed concentration (C2), whereby the accuracy of the determination can be further improved. Further, the information data on the alkalinity is transmitted to the treatment agent addition management unit 21 to be described later, and feedback control is performed concerning the addition amount of the acid

gas treatment agent in the treatment agent addition management unit 21, whereby the addition amount of the acid gas treatment agent can be calculated more accurately.

[0065]

As the index of the alkalinity, for example, "acid consumption (pH 8.3)" can be used. Here, the term "acid consumption (pH 8.3)" refers to the acid consumption when an acid is added and neutralized until the pH reaches 8.3. Note that the acid consumption in the fly ash (pH 8.3) may be a value (unit: mg · CaCO₃/g · fly ash) measured with respect to a solution obtained by adding 1 L of pure water to 1 g of the fly ash.

[0066]

[Pre-treatment exhaust gas analysis unit and post-treatment exhaust gas analysis unit]

The pre-treatment exhaust gas analysis unit 11 and the post-treatment exhaust gas analysis unit 20 are disposed upstream and downstream (in the flow of the exhaust gas) of the exhaust gas treatment unit 12, respectively. The pre-treatment exhaust gas analysis unit 11 and the post-treatment exhaust gas analysis unit 20 analyze the concentrations of the acid gas contained in the exhaust gas before and after the addition of the acid gas treatment agent (hereinafter referred to as "pre-treatment acid gas concentration" and "post-treatment acid gas concentration," respectively). The pre-treatment exhaust gas analysis unit 11 and the post-treatment exhaust gas analysis unit 20 are connected to the treatment agent addition management unit 21 and the server unit 22 in a state where at least information data can be transmitted. Each of the pre-treatment exhaust gas analysis unit 11 and the post-treatment exhaust gas analysis unit 20 transmits

information data to the information data treatment agent addition management unit 21 and the server unit 22, and the information data is used here to determine the addition amount of the acid gas treatment agent in the treatment agent addition management unit 21 and to determine whether or not the post-treatment acid gas concentration (C1) in the server unit 22 is appropriate, so that the accuracy of such determination can be further enhanced. Since the pre-treatment exhaust gas analysis unit 11 and the post-treatment exhaust gas analysis unit 20 differ only in the installation location and differ only in the upstream side or the downstream side (in the flow of the exhaust gas) with the exhaust gas treatment unit 12 as a boundary, the two units will be described together below.

[0067]

Although Figure 1 illustrates the example of including the pre-treatment exhaust gas analysis unit 11 and the post-treatment exhaust gas analysis unit 20 that are disposed upstream and downstream of the exhaust gas treatment unit 12, respectively, the exhaust gas analysis unit may only be disposed at least on the downstream side of the upstream and downstream sides of the exhaust gas treatment unit 12, that is, the pre-treatment exhaust gas analysis unit 11 is an arbitrary constituent element. However, as illustrated in Figure 1, by disposing the exhaust gas analysis units both on the upstream and downstream sides, it is possible to further enhance the accuracy of the determination of the addition amount of the acid gas treatment agent in the treatment agent addition management unit 21 and the accuracy of the determination of whether or not the post-treatment acid gas concentration (C1) in the server unit 22 is appropriate. Further, as each of the pre-treatment

exhaust gas analysis unit 11 and post-treatment exhaust gas analysis unit 20, one unit may be disposed or a plurality of units may be disposed on each of the upstream side and the downstream side.

[0068]

The pre-treatment exhaust gas analysis unit 11 can measure the concentration of the acid gas contained in the exhaust gas to be treated by the exhaust gas treatment unit 12. The acid gas concentration can be obtained using, for example, an acid gas concentration meter or the like, whereby the amount of the acid gas treatment agent necessary for neutralization of the acid gas can be calculated, and this information data is transmitted to the treatment agent addition management unit 21, where the addition amount of the acid gas treatment agent in the treatment agent supply unit 14 can be determined. When the purpose is only to control the amount of the acid gas treatment agent, a predetermined volume of the exhaust gas may be collected and an alkali compound may be actually added to calculate the amount of the acid gas treatment agent necessary for neutralizing the acid gas contained in the exhaust gas.

[0069]

In the post-treatment exhaust gas analysis unit 20, the concentration (C1) of the acid gas contained in the exhaust gas after the treatment by the exhaust gas treatment unit 12 can be measured by the same method as in the pre-treatment exhaust gas analysis unit 11 described above. It is thus possible to monitor harmful acid gas to prevent such acid gas from being discharged to the outside air and to confirm whether or not the acid gas has been sufficiently neutralized by at least an amount of the acid gas treatment agent calculated on the basis

of the amount of acid in the exhaust gas of the post-treatment exhaust gas analysis unit 20. When the post-treatment exhaust gas analysis unit 20 is disposed, the post-treatment exhaust gas analysis unit 20 is preferably disposed downstream in the positional relationship with the fly ash collection unit 16 but may be disposed upstream.

[0070]

Each of the pre-treatment exhaust gas analysis unit 11 and the post-treatment exhaust gas analysis unit 20 may measure the exhaust gas amount (flow rate) together with the concentration of the acid gas contained in the exhaust gas before or after the addition of the acid gas treatment agent and may thereby have information data on the measured flow rate. The exhaust gas amount hardly changes before and after the addition of the acid gas treatment agent, and thus either exhaust gas amount may be used. By measuring the exhaust gas amount in this way, it is possible to calculate the absolute amount of the acid gas contained in the exhaust gas together with the information data on the acid gas concentration, and to more accurately calculate the minimum required amount of the acid gas treatment agent and the like. In this case, for example, a gas flow meter or the like may be used as each of the pre-treatment exhaust gas analysis unit 11 and the post-treatment exhaust gas analysis unit 20 in addition to the device for calculating the acid gas concentration described above.

[0071]

[Treatment agent addition management unit]

The treatment agent addition management unit 21 calculates the addition amount of the acid gas treatment agent with which the post-treatment acid gas concentration (C1) measured by the post-treatment

exhaust gas analysis unit 20 is always equal to or less than a predetermined managed concentration (C2) and instructs the treatment agent supply unit 14 to supply the acid gas treatment agent in the calculated addition amount to the exhaust gas treatment unit 12.

[0072]

The treatment agent addition management unit 21 includes at least an arithmetic device, a recording device, and a communication device.

[0073]

The means for managing the addition of the acid gas treatment agent is not particularly limited so long as the means is a method that can calculate the addition amount of the acid gas treatment agent with which the post-treatment acid gas concentration (C1) is always equal to or less than the predetermined managed concentration (C2), but as an example, below the pre-treatment exhaust gas analysis unit 11, more specifically, a method for calculating the minimum addition amount of the acid gas treatment agent necessary for treating the acid gas in the exhaust gas from the concentration of the acid gas contained in the exhaust gas before treatment will be described.

[0074]

First, a weight W_{acid} [kg/h] of the acid gas to be treated per hour is obtained by Formula (1) below:

$$W_{\text{acid}} = (C_{\text{acid, in}} - C_{\text{acid, out}}) \times V_g / 10^6 \quad (1)$$

where $C_{\text{acid, in}}$ [mg/Nm³] and $C_{\text{acid, out}}$ [mg/Nm³] are the concentrations of the acid gas before and after the treatment with the acid gas treatment agent, and $C_{\text{acid, out}}$ [mg/Nm³] is the managed concentration (C2). In addition, V_g [Nm³/h] is a treatment volume per hour of exhaust gas

converted into dry gas in a standard state (0°C, 1 atm). V_g may be a constant when the flow rate of the gas to be treated is substantially fixed, or may be actually measured by providing an exhaust gas flow meter (not illustrated) in the flow path (including the inlet or outlet) when an increase or decrease in the flow rate of the gas is large.

[0075]

Here, the term "managed concentration" refers to a concentration that should be managed at the time of discharge, such as a reference discharge concentration. At this managed concentration (C_2), it can be said that the amount of the added acid gas treatment agent is not excessive or insufficient with respect to the amount of the acid gas in order to achieve the reference discharge concentration or the like.

[0076]

Next, an amount W_{alkaline} [kg/h] of the acid gas treatment agent necessary for treating the acid gas is determined by Formula (2) below:

$$W_{\text{alkaline}} = n_{\text{acid}} \times W_{\text{acid}} \times M_{\text{w, alkaline}} / (n_{\text{alkaline}} \times M_{\text{w, acid}}) \quad (2)$$

where $M_{\text{w, acid}}$ [g/mol] and $M_{\text{w, alkaline}}$ [g/mol] are the molecular weight of the acid compound constituting the acid gas and the molecular weight of the alkali constituting the acid gas treatment agent, n_{acid} is the acid valence of the acid gas, and n_{alkaline} is the alkaline valence of the alkali constituting the acid gas treatment agent.

[0077]

Here, when Equation (1) is substituted for W_{acid} in Equation (2), Equation (3) below is obtained:

$$W_{\text{alkaline}} = \{n_{\text{acid}} \times (C_{\text{acid, in}} - C_{\text{acid, out}}) \times M_{\text{w, alkaline}} / (n_{\text{alkaline}} \times M_{\text{w, acid}})\} \times V_g / 10^6 \quad (3).$$

[0078]

An amount obtained by adding a predetermined excess amount (safe amount) to the minimum addition amount W_{alkaline} of the acid gas treatment agent obtained from Equation (3) above can be obtained as the addition amount of the acid gas treatment agent.

[0079]

That is, as described above, in the operation of the ordinary exhaust gas treatment system 1, in order to cope with rapid variation in the properties of the exhaust gas, the acid gas treatment agent is added in a larger amount than an amount that is not excessive or insufficient for the acid gas treatment agent at the managed concentration (C2). In the exhaust gas treatment system 1, the operator tends to increase the excess amount in consideration of safety, so that an excessive acid gas treatment agent has been added, and a large amount of alkali has remained in the fly ash.

[0080]

On the other hand, the difference between the acid gas concentration in the exhaust gas after the treatment and the managed concentration (C2) is preferably as small as possible so long as the acid gas concentration is equal to the managed concentration (C2) or does not exceed the managed concentration (C2) ideally at all times. Then, it is necessary to confirm whether or not the operator of the exhaust gas treatment system 1 is performing the exhaust gas treatment properly in relation to the managed concentration (C2). Therefore, in the present invention, the server unit 22 is provided as a means for confirming whether or not the operator of the exhaust gas treatment system 1 is performing the exhaust gas treatment properly in relation to the managed concentration (C2). The server unit 22 will be described below.

[0081]

[Server unit]

The server unit 22 gathers and analyzes information data from at least the post-treatment exhaust gas analysis unit 20, the treatment agent supply amount measurement unit 15, and the incineration object supply amount measurement unit 10 and determines whether the post-treatment acid gas concentration (C1) is proper in relation to the managed concentration (C2) from a result of the analysis. That is, the server unit 22 is connected to the post-treatment exhaust gas analysis unit 20, the treatment agent supply amount measurement unit 15, and the incineration object supply amount measurement unit 10 in a state where at least information data can be received.

[0082]

The server unit 22 includes at least an arithmetic device, a recording device, and a communication device.

[0083]

Specifically, as a method for the determination, a method may be mentioned in which an average deviation concentration range ($C2 - C1$) of the post-treatment acid gas concentration (C1) from the managed concentration (C2) is calculated, and it is determined whether or not the average deviation concentration range ($C2 - C1$) is within a threshold. From the viewpoint of considering the cost, the excessive-addition cost of the acid gas treatment agent is calculated on the basis of the average deviation concentration range ($C2 - C1$). More specifically, due to the presence of the average deviation concentration range ($C2 - C1$), and with this amount, the amount of the acid gas treatment agent that is added in excess is calculated, a unit price for the acid gas treatment agent

and an empirical variable (a variable based on the fact that the lower the removal rate of the acid gas treatment agent, the lower the reaction equivalence, and a variable that can be selected from the experience of a person skilled in the art), which are information data that the server unit 22 has in advance, are integrated to calculate the excessive-addition cost of the acid gas treatment agent. A method of determining whether or not the excessive-addition cost calculated in this manner is within a threshold may be mentioned. Note that the average deviation concentration range and the excessive-addition cost can be determined with respect to an integrated value over a certain period (e.g., one day, one week, two weeks, one month, etc.) in accordance with the operation of the exhaust gas treatment system 1.

[0084]

Then, the server unit 22 makes a determination in this manner, and reduces the addition amount of the acid gas treatment agent such that the average deviation concentration range ($C2 - C1$) becomes a positive value and narrow only when the average deviation concentration range ($C2 - C1$) or the excessive-addition cost exceeds the threshold.

[0085]

The server unit 22 may gather and analyze information data from the treatment agent supply amount measurement unit 15 and the incineration object supply amount measurement unit 10. Specifically, the supply amount of the treatment agent per supply amount of the incineration object may be calculated to determine whether or not the supply amount of the treatment agent is appropriate.

[0086]

The server unit 22 can calculate the actual cost of the acid gas with respect to the cost of the acid gas treatment agent in the case of always operating at the managed concentration (C2) over a certain period (e.g., one day, one week, two weeks, one month, etc.), or the like, to calculate an achievement rate. The server unit 22 may further have a function of notifying a person in charge of the exhaust gas treatment system 1 or a person concerned such as a treatment agent supplier of the achievement rate.

[0087]

The server unit 22 may have a function of notifying a person in charge of the exhaust gas treatment system 1 (operator, etc.) or a person concerned such as a treatment agent supplier of the excessive-addition cost over a certain period. The server unit 22 may have a function of collecting information data on the post-treatment acid gas concentration (C1) and the managed concentration (C2), recording the information data over time, and notifying a person in charge of the exhaust gas treatment system 1 or a person concerned such as a treatment agent supplier of the information data. In this way, the server unit 22 notifies the person concerned of the excessive-addition cost over a certain period and the information data on the post-treatment acid gas concentration (C1) and the managed concentration (C2), whereby, for example, a person in charge of accounting can confirm that the operator is not excessively but appropriately adding the acid gas treatment. Further, the manufacturer of the acid gas treatment agent can confirm whether the performance of the acid gas treatment agent is being exhibited optimally. Moreover, the manufacturer of the control device of the exhaust gas treatment system 1

can confirm whether the control of the system is being performed optimally.

[0088]

The server unit 22 may also have information data on a unit price for the incineration object disposal calculated, for example, at the time of the past operation of the exhaust gas treatment system 1, or calculated on average from the past operation. For example, the unit price for the acid gas treatment agent is integrated with the actual usage amount of the acid gas treatment agent and divided by the supply amount of the incineration object measured by the incineration object supply amount measurement unit 10, whereby an actual unit price for the incineration object disposal required for the treatment of the incineration object per weight can be calculated. Whether the actual unit price for the incineration object disposal is high or low may be evaluated by comparing the actual unit price for the incineration object disposal with a unit price for the incineration object disposal at the time of treating exhaust gas generated from an incineration object discharged from the same place of business or a unit price for the incineration object disposal at the time of treating exhaust gas having a similar acid gas concentration.

[0089]

<Exhaust gas treatment method>

The exhaust gas treatment method according to the present embodiment can be performed, for example, by using the exhaust gas treatment system 1 described above. Specifically the exhaust gas treatment method is an exhaust gas treatment method including the steps of: treating, by the exhaust gas treatment unit 12, acid gas contained in exhaust gas; supplying, by the treatment agent supply unit

14, an acid gas treatment agent to the exhaust gas treatment unit 12; measuring, by the post-treatment exhaust gas analysis unit 20, a post-treatment acid gas concentration (C1), the post-treatment acid gas concentration (C1) being a concentration of the acid gas contained in the exhaust gas after the treatment by the exhaust gas treatment unit; and calculating, by the treatment agent addition management unit 21, an addition amount of the acid gas treatment agent with which the post-treatment acid gas concentration (C1) measured by the post-treatment exhaust gas analysis unit 20 is always equal to or less than a predetermined managed concentration (C2) and instructing the treatment agent supply unit 14 to supply the acid gas treatment agent in the calculated addition amount to the exhaust gas treatment unit 12, the exhaust gas treatment method further including the steps of: measuring a supply amount of an incineration object by the incineration object supply amount measurement unit 15 located upstream of the exhaust gas treatment unit 12; measuring, by the treatment agent supply amount measurement unit 15, a supply amount of the acid gas treatment agent supplied from the treatment agent supply unit 14; and gathering and analyzing, by the server unit 22, information data from at least the post-treatment exhaust gas analysis unit 20, the treatment agent supply amount measurement unit 15, and the incineration object supply amount measurement unit 10 and determining whether the post-treatment acid gas concentration (C1) is proper in relation to the managed concentration (C2) from a result of the analysis.

[0090]

The exhaust gas treatment method preferably further includes a step of calculating an excessive-addition cost of the acid gas treatment

agent on the basis of an average deviation concentration range ($C2 - C1$) of the post-treatment acid gas concentration ($C1$) from the managed concentration ($C2$), and reducing the addition amount of the acid gas treatment agent such that the average deviation concentration range ($C2 - C1$) becomes a positive value and narrow only when the excessive-addition cost exceeds a threshold.

[0091]

A more specific operation of this exhaust gas treatment method is similar to the operation of each unit of the exhaust gas treatment system described above, and hence a detailed description thereof will be omitted.

REFERENCE SIGNS LIST

[0092]

- 1 exhaust gas treatment system
- 10 incineration object supply amount measurement unit
- 11 pre-treatment exhaust gas analysis unit
- 12 exhaust gas treatment unit
- 13 treatment agent storage unit
- 14 treatment agent supply unit
- 15 treatment agent supply amount measurement unit
- 16 fly ash collection unit
- 17 treatment temperature measurement unit
- 18 fly ash storage unit
- 19 fly ash analysis unit
- 20 post-treatment exhaust gas analysis unit
- 21 treatment agent addition management unit
- 22 server unit

F incinerator

CLAIMS

1. An exhaust gas treatment system comprising:
 - an exhaust gas treatment unit that treats acid gas contained in exhaust gas;
 - a treatment agent supply unit that supplies an acid gas treatment agent to the exhaust gas treatment unit;
 - a post-treatment exhaust gas analysis unit that measures a post-treatment acid gas concentration (C1), the post-treatment acid gas concentration (C1) being a concentration of the acid gas contained in the exhaust gas after the treatment by the exhaust gas treatment unit; and
 - a treatment agent addition management unit that calculates an addition amount of the acid gas treatment agent with which the post-treatment acid gas concentration (C1) measured by the post-treatment exhaust gas analysis unit is always equal to or less than a predetermined managed concentration (C2) and instructs the treatment agent supply unit to supply the acid gas treatment agent in the calculated addition amount to the exhaust gas treatment unit,the exhaust gas treatment system further comprising:
 - an incineration object supply amount measurement unit that is located upstream of the exhaust gas treatment unit and measures a supply amount of an incineration object;
 - a treatment agent supply amount measurement unit that measures a supply amount of the acid gas treatment agent supplied from the treatment agent supply unit; and
 - a server unit that gathers and analyzes information data from at least the post-treatment exhaust gas analysis unit, the treatment agent

supply amount measurement unit, and the incineration object supply amount measurement unit and, based on a result of the analysis, determines whether the post-treatment acid gas concentration (C1) is proper in relation to the managed concentration (C2) by calculating an average deviation concentration range ($C2 - C1$) of the post-treatment acid gas concentration (C1) from the managed concentration (C2) or an excessive-addition cost of the acid gas treatment agent on a basis of the average deviation concentration range ($C2 - C1$) to determine whether the average deviation concentration range ($C2 - C1$) or the excessive-addition cost of the acid gas treatment agent is within a threshold, and, only when the average deviation concentration range ($C2 - C1$) or the excessive-addition cost of the acid gas treatment agent exceeds a threshold and it is determined as not proper in the relation therebetween, makes a determination to reduce the addition amount of the acid gas treatment agent such that the average deviation concentration range ($C2 - C1$) becomes a positive value and narrow,

wherein the addition amount of the acid gas treatment agent to be calculated by the treatment agent addition management unit is an amount prepared by adding a predetermined excessive amount as a safe amount to a minimum addition amount required for treating the acid gas at the exhaust gas treatment unit.

2. The exhaust gas treatment system according to claim 1, wherein the server unit further includes information data on a unit price for the acid gas treatment agent and a unit price for incineration object disposal.

3. The exhaust gas treatment system according to claim 1 or 2, further comprising, upstream of the exhaust gas treatment unit, a pre-treatment exhaust gas analysis unit that measures an exhaust gas amount and a pre-treatment acid gas concentration prior to the treatment by the exhaust gas treatment unit, the pre-treatment acid gas concentration being a concentration of the acid gas contained in the exhaust gas,

wherein the server unit further includes information data from the pre-treatment exhaust gas analysis unit.

4. The exhaust gas treatment system according to claim 1, 2, or 3, further comprising, downstream of the exhaust gas treatment unit:

a fly ash collection unit;

a treatment temperature measurement unit that measures a treatment temperature at any position from the exhaust gas treatment unit to the fly ash collection unit; and

a fly ash analysis unit that analyzes alkalinity of fly ash treated by the fly ash collection unit,

wherein the server unit further includes information data from the treatment temperature measurement unit and the fly ash analysis unit.

5. The exhaust gas treatment system according to any one of claims 1 to 4, wherein the treatment agent addition management unit further has a function of notifying a person in charge of the exhaust gas treatment system or a person concerned such as a treatment agent supplier of the excessive-addition cost over a certain period.

6. The exhaust gas treatment system according to any one of claims 1 to 5, wherein the server unit further has a function of collecting information data on the post-treatment acid gas concentration (C1) and the managed concentration (C2), recording the information data over time, and notifying a person in charge of the exhaust gas treatment system or a person concerned such as a treatment agent supplier of the information data.

7. An exhaust gas treatment method comprising the steps of:
treating, by an exhaust gas treatment unit, acid gas contained in exhaust gas;
supplying, by a treatment agent supply unit, an acid gas treatment agent to the exhaust gas treatment unit;
measuring, by a post-treatment exhaust gas analysis unit, a post-treatment acid gas concentration (C1), the post-treatment acid gas concentration (C1) being a concentration of the acid gas contained in the exhaust gas after the treatment by the exhaust gas treatment unit; and
calculating, by a treatment agent addition management unit, an addition amount of the acid gas treatment agent with which the post-treatment acid gas concentration (C1) measured by the post-treatment exhaust gas analysis unit is always equal to or less than a predetermined managed concentration (C2) and instructing the treatment agent supply unit to supply the acid gas treatment agent in the calculated addition amount to the exhaust gas treatment unit,
the exhaust gas treatment method further comprising the steps of:

measuring a supply amount of an incineration object by an incineration object supply amount measurement unit located upstream of the exhaust gas treatment unit;

measuring, by a treatment agent supply amount measurement unit, a supply amount of the acid gas treatment agent supplied from the treatment agent supply unit; and

gathering and analyzing, by a server unit, information data from at least the post-treatment exhaust gas analysis unit, the treatment agent supply amount measurement unit, and the incineration object supply amount measurement unit and, based on a result of the analysis, determining whether the post-treatment acid gas concentration (C1) is proper in relation to the managed concentration (C2) by calculating an average deviation concentration range ($C2 - C1$) of the post-treatment acid gas concentration (C1) from the managed concentration (C2) or an excessive-addition cost of the acid gas treatment agent on a basis of the average deviation concentration range ($C2 - C1$) to determine whether the average deviation concentration range ($C2 - C1$) or the excessive-addition cost of the acid gas treatment agent is within a threshold, and, only when the average deviation concentration range ($C2 - C1$) or the excessive-addition cost of the acid gas treatment agent exceeds a threshold and it is determined as not proper in the relation therebetween, making a determination to reduce the addition amount of the acid gas treatment agent such that the average deviation concentration range ($C2 - C1$) becomes a positive value and narrow,

wherein the addition amount of the acid gas treatment agent to be calculated by the treatment agent addition management unit is an amount prepared by adding a predetermined excessive amount as a safe

amount to a minimum addition amount required for treating the acid gas at the exhaust gas treatment unit.