the exhaust gas treatment method of the related art, the slaked lime is caused to react with the acidic gas at 190°C or lower.

Citation List

Patent Literature

[0003]

[PTL 1] Japanese Unexamined Patent Application Publication No. 11-248124

[PTL 2] Japanese Patent No. 3368751

Summary of Invention

[0004]

However, if the temperature at which slaked lime is caused to react with the acidic gas is made low, the acidic gas may condense and the liquid matter from the acidic gas may be created. Since the liquid matter from the acidic gas has high corrosiveness, the corrosion of a device that treats the exhaust gas may be caused. Additionally, since the temperature of the exhaust gas is a high temperature of 220°C or higher, the treatment of owering the temperature of the exhaust gas is required in order to set the temperature, at which the slaked lime is caused to react with the acidic gas, to be lower than 190°C. Therefore, as illustrated in Fig. 11, the temperature adjusting unit 10 that adjusts the temperature

of the exhaust gas is provided. Moreover, when the denitrification treatment on the exhaust gas from which the acidic gas is removed is performed in the denitrification device B, it is necessary to reheat the exhaust gas using the reheater D in order to bring about a temperature (210°C or higher) suitable for a denitrification reaction. Therefore, the temperature is again raised after being lowered first, and the amount of energy consumed tends to increase.

Meanwhile, if the related-art slaked lime is used, the reactivity becomes insufficient if the temperature at which the slaked lime is caused to react with the acidic gas is made high. Therefore, the amount of slaked lime used tends to increase. The invention seeks to provide an exhaust gas treatment method, an exhaust gas treatment device, and an exhaust gas treatment system that can obtain sufficient acidic gas removal performance without increasing the amount of slaked lime used, even when the temperature at which the slaked lime is caused to react with the acidic gas is made high (specifically, 190°C or higher).

[0005]

According to a first aspect of the invention, there is provided an exhaust gas treatment method including: a reaction process of adding slaked lime to an exhaust gas containing acidic gases and causing the slaked lime to

react with the acidic gases at 190°C or higher; and a removal process of removing a reaction product obtained by the reaction process from the exhaust gas, using a bag filter. The specific surface area of the slaked lime measured by the BET method is equal to or greater than 25 m^2/g and the pore volume of the slaked lime measured by the nitrogen desorption BJH method is equal to or greater than 0.15 cm^3/g. The bag filter is a filter cloth.

In the exhaust gas treatment method, an exhaust gas purification catalyst may be supported on the bag filter.

In the exhaust gas treatment method, activated carbon may be added together with the slaked lime in the reaction process.

[0006]

According to a second aspect of the invention, there is provided and exhaust gas treatment device including: a reaction unit that includes gas purification agent addition means for adding a gas purification agent to an exhaust gas containing an acidic gas and having a temperature of 190°C or higher and that causes the gas purification agent to react with the acidic gas; and a removal unit including a bag filter that removes a reaction product obtained by the reaction unit from the exhaust gas. The gas purification agent contains slaked lime of which the specific surface area measured by the

BET method is equal to or greater than 25 m^2/g and the pore volume measured by the nitrogen desorption BJH method is equal to or greater than 0.15 cm^3/g. The bag filter is a filter cloth.

In the exhaust gas treatment device, the exhaust gas purification catalyst may be supported on the bag filter.

In the exhaust gas treatment device, the gas purification agent may further contain activated carbon.

[0007]

According to a third aspect of the invention, there is provided an exhaust gas treatment system including: a reaction unit that includes gas purification agent addition means for adding a gas purification agent to an exhaust gas containing an acidic gas and having a temperature of 190°C or higher and that causes the gas purification agent to react with the acidic gas; and a removal unit including a bag filter that removes a reaction product obtained by the reaction unit from the exhaust gas. The gas purification agent contains slaked lime of which the specific surface area measured by the BET method is equal to or greater than 25 m^2/g and the pore volume measured by the nitrogen desorption BJH method is equal to or greater than 0.15 cm^3/g. The bag filter is a filter cloth.

The exhaust gas treatment system may further include a temperature adjusting unit that adjusts the temperature of the exhaust gas to 190°C or higher in a preceding stage of the reaction unit.

The exhaust gas treatment system may further include a denitrification device that performs denitrification treatment of the exhaust gas in a subsequent stage of the removal unit.

The exhaust gas treatment system may further include a reheater that reheats the exhaust gas between the removal unit and the denitrification device.

In the exhaust gas treatment system, the exhaust gas purification catalyst may be supported on the bag filter.

In the exhaust gas treatment system, the gas purification agent may further contain activated carbon.

Throughout this specification and the claims which follow, unless the context requires otherwise, the word “comprise”, and variations such as “comprises” and “comprising”, will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps. The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgement or admission or any form of suggestion that prior publication (or information

derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

Advantageous Effects of Invention

[0008]

It was found that the slaked lime of which the specific surface area measured by the BET method measured is equal to or greater than 25 m^2/g, and the pore volume measured by the nitrogen desorption BJH method is equal to or greater than 0.15 cm^3/g has a high activity with the acidic gas. In the above-described exhaust gas treatment method, exhaust gas treatment device, and exhaust gas treatment system using this slaked lime, sufficient acidic gas removal performance can be obtained without increasing the amount of slaked lime used, even when the temperature at which the slaked lime is caused to react with the acidic gas is set to a temperature of 190°C or higher.

In the above-described exhaust gas treatment method, exhaust gas treatment device, and exhaust gas treatment system, if a bag filter on which an exhaust gas purification catalyst is supported is used as the above bag filter, it is possible to remove dioxins or nitrogen oxides contained in the exhaust gas. Therefore, the exhaust gas can be further purified.

THE CLAIMS DEFIINING THE INVENTION ARE AS FOLLOWS:

[Claim 1]

An exhaust gas treatment method comprising:

a reaction process of adding slaked lime to an exhaust gas containing acidic gases and causing the slaked lime to react with the acidic gases at 190°C or higher; and

a removal process of removing a reaction product obtained by the reaction process from the exhaust gas, using a bag filter,

wherein the specific surface area of the slaked lime measured by the BET method is equal to or greater than 25 m^2/g and the pore volume of the slaked lime measured by the nitrogen desorption BJH method is equal to or greater than 0.15 cm^3/g, and

wherein the bag filter is a filter cloth.

[Claim 2]

The exhaust gas treatment method according to Claim 1,

wherein an exhaust gas purification catalyst is supported on the bag filter.

[Claim 3]

The exhaust gas treatment method according to Claim 1 or 2,

wherein activated carbon is added together with the slaked lime in the reaction process.

[Claim 4]

An exhaust gas treatment device comprising:

a reaction unit that includes gas purification agent addition means for adding a gas purification agent to an exhaust gas containing an acidic gas and having a temperature of 190°C or higher and that causes the gas purification agent to react with the acidic gas; and

a removal unit including a bag filter that removes a reaction product obtained by the reaction unit from the exhaust gas,

wherein the gas purification agent contains slaked lime of which the specific surface area measured by the BET method is equal to or greater than 25 m^2/g and the pore volume measured by the nitrogen desorption BJH method is equal to or greater than 0.15 cm3/g, and

wherein the bag filter is a filter cloth.

[Claim 5]

The exhaust gas treatment device according to Claim 4,

wherein the exhaust gas purification catalyst is supported on the bag filter.

[Claim 6]

The exhaust gas treatment device according to Claim 4 or 5,

wherein the gas purification agent further contains activated carbon.

[Claim 7]

An exhaust gas treatment system comprising:

a reaction unit that includes gas purification agent addition means for adding a gas purification agent to an exhaust gas containing an acidic gas and having a temperature of 190°C or higher and that causes the gas purification agent to react with the acidic gas; and

a removal unit including a bag filter that removes a reaction product obtained by the reaction unit from the exhaust gas,

wherein the gas purification agent contains slaked lime of which the specific surface area measured by the BET method is equal to or greater than 25 m^2/g and the pore volume measured by the nitrogen desorption BJH method is equal to or greater than 0.15 cm^3/g, and

wherein the bag filter is a filter cloth.

[Claim 8]

The exhaust gas treatment system according to Claim 7, further comprising:

a temperature adjusting unit that adjusts the temperature of the exhaust gas to 190°C or higher in a preceding stage of the reaction unit.

[Claim 9]

The exhaust gas treatment system according to Claim 7 or 8, further comprising:

a denitrification device that performs denitrification treatment of the exhaust gas in a subsequent stage of the removal unit.

[Claim 10]

The exhaust gas treatment system according to Claim 9, further comprising:

a reheater that reheats the exhaust gas between the removal unit and the denitrification device.

[Claim 11]

The exhaust gas treatment system according to any one of Claims 7 to 10,

wherein the exhaust gas purification catalyst is supported on the bag filter.

[Claim 12]

The exhaust gas treatment system according to any one of Claims 7 to 11,

wherein the gas purification agent further contains activated carbon.