Technical Problem

[0005]

As in the technique described in PTL 1, in general ultraviolet absorptiometry, a high-voltage lamp such as a xenon lamp or a mercury lamp is used as a white light source. However, the high-voltage lamp has a short life, and the high-voltage lamp has a problem in that the stability of light emitting intensity is low. Therefore, it is conceivable to use a light emitting diode (LED) having a long light source life and being excellent in light emitting intensity. Here, since the LED has a narrow wavelength width of an emission spectrum and is monochromatic light, a light source having a wavelength corresponding to the absorption spectrum of a measurement target is selected. However, in a case where substances having the same absorption wavelength band as the absorption wavelength band of the measurement target are mixed, in the technique using a monochromatic LED, it is not possible to accurately measure the concentration of the measurement target because the light absorption by the measurement target and the light absorption by the mixture cannot be separated.

[0006]

Embodiments of the present invention provide a corrosion prevention device and a corrosion prevention method in which

a light source life is long and it is possible to measure the absorbance and/or the transmittance of a substance in a mixture containing two or more substances having similar absorption wavelengths.

Solution to Problem

[0007]

Aspects of the present invention are as shown below.

According to a first aspect of the present invention, there is provided a corrosion prevention device including: a first light source unit provided with a light emitting diode that emits irradiation light in an absorption wavelength band that includes an absorption spectrum of a first measurement target produced by combustion of a combustion object; a second light source unit provided with a light emitting diode that emits irradiation light in an absorption wavelength band that includes an absorption spectrum which is an absorption spectrum of a second measurement target produced by combustion of the combustion object and is different from the absorption spectrum of the first measurement target; a first light receiving unit that receives the irradiation light emitted from the first light source unit; a second light receiving unit that receives the irradiation light emitted from the second light source unit; a calculation unit

that calculates absorbance and/or transmittance of the first measurement target in a combustion gas generated by combustion of the combustion object, based on transmitted light intensity I_1 of the irradiation light received by the first light receiving unit and transmitted light intensity I_2 of the irradiation light received by the second light receiving unit; a corrosion inhibitor supply unit that supplies a corrosion inhibitor that reacts with the first measurement target to the combustion gas; and a supply amount control unit that controls a supply amount of the corrosion inhibitor that is supplied from the corrosion inhibitor supply unit, wherein the supply amount control unit controls the supply amount of the corrosion inhibitor, based on the absorbance and/or the transmittance of the first measurement target calculated by the calculation unit.

An embodiment of the corrosion prevention device, further includes: a third light source unit provided with a light emitting diode that emits irradiation light in an absorption wavelength band that includes an absorption spectrum which is an absorption spectrum of a third measurement target produced from the corrosion inhibitor and is different from the absorption spectra of the first and second measurement targets; and a third light receiving unit that receives the irradiation light emitted from the third light source unit, wherein the calculation unit

calculates absorbance and/or transmittance of the third measurement target in the combustion gas, based on transmitted light intensity I_3 of the irradiation light received by the third light receiving unit and the transmitted light intensity I_2 of the irradiation light received by the second light receiving unit, and the supply amount control unit controls the supply amount of the corrosion inhibitor, based on the absorbance and/or the transmittance of the first and third measurement targets calculated by the calculation unit.

According to a second aspect of the present invention, there is provided a corrosion prevention method including: emitting irradiation light in an absorption wavelength band that includes an absorption spectrum of a first measurement target produced by combustion of a combustion object, and irradiation light in an absorption wavelength band that includes an absorption spectrum which is an absorption spectrum of a second measurement target produced by combustion of the combustion object and is different from the absorption spectrum of the first measurement target, from a first light source unit or a second light source unit each provided with a light emitting diode toward a combustion gas generated by combustion of the combustion object; receiving the irradiation light emitted from the first light source unit and the irradiation light emitted from the

second light source unit by a first light receiving unit or a second light receiving unit; calculating absorbance and/or transmittance of the first measurement target by a calculation unit, based on transmitted light intensity I_1 of the irradiation light received by the first light receiving unit and transmitted light intensity I_2 of the irradiation light received by the second light receiving unit; controlling a supply amount of a corrosion inhibitor that reacts with the first measurement target, based on the absorbance and/or the transmittance of the first measurement target calculated by the calculation unit; and supplying the corrosion inhibitor to the combustion gas.

An embodiment of the corrosion prevention method, further includes: emitting irradiation light in an absorption wavelength band that includes an absorption spectrum which is an absorption spectrum of a third measurement target produced from the corrosion inhibitor and is different from the absorption spectra of the first and second measurement targets, from a third light source unit provided with a light emitting diode toward the combustion gas; receiving the irradiation light emitted from the third light source unit by a third light receiving unit; calculating absorbance and/or transmittance of the third measurement target by the calculation unit, based on transmitted light intensity I_3 of the irradiation light received by the third

light receiving unit and the transmitted light intensity I_2 of the irradiation light received by the second light receiving unit; controlling the supply amount of the corrosion inhibitor that reacts with the first measurement target, based on the absorbance and/or the transmittance of the first and third measurement targets calculated by the calculation unit; and supplying the corrosion inhibitor to the combustion gas.

Advantageous Effects of Invention

[0008]

According to embodiments of the present invention, it is possible to provide a corrosion prevention device and a corrosion prevention method in which a light source life is long and it is possible to measure the absorbance and/or transmittance of a substance in a mixture containing two or more substances having similar absorption wavelengths.

Brief Description of Drawings

[0009]

Fig. 1 is a schematic diagram showing a first embodiment of the present invention.

CLAIMS

1. A corrosion prevention device comprising:

a first light source unit provided with a light emitting diode that emits irradiation light in an absorption wavelength band that includes an absorption spectrum of a first measurement target produced by combustion of a combustion object;

a second light source unit provided with a light emitting diode that emits irradiation light in an absorption wavelength band that includes an absorption spectrum which is an absorption spectrum of a second measurement target produced by combustion of the combustion object and is different from the absorption spectrum of the first measurement target;

a first light receiving unit that receives the irradiation light emitted from the first light source unit;

a second light receiving unit that receives the irradiation light emitted from the second light source unit;

a calculation unit that calculates absorbance and/or transmittance of the first measurement target in a combustion gas generated by combustion of the combustion object, based on transmitted light intensity I_1 of the irradiation light received by the first light receiving unit and transmitted light intensity I_2 of the irradiation light received by the second light receiving unit;

a corrosion inhibitor supply unit that supplies a corrosion inhibitor that reacts with the first measurement target to the combustion gas; and

a supply amount control unit that controls a supply amount of the corrosion inhibitor that is supplied from the corrosion inhibitor supply unit,

wherein the supply amount control unit controls the supply amount of the corrosion inhibitor, based on the absorbance and/or the transmittance of the first measurement target calculated by the calculation unit.

2. The corrosion prevention device according to claim 1, further comprising:

a third light source unit provided with a light emitting diode that emits irradiation light in an absorption wavelength band that includes an absorption spectrum which is an absorption spectrum of a third measurement target produced from the corrosion inhibitor and is different from the absorption spectra of the first and second measurement targets; and

a third light receiving unit that receives the irradiation light emitted from the third light source unit,

wherein the calculation unit calculates absorbance and/or transmittance of the third measurement target in the combustion gas, based on transmitted light intensity I_3 of the irradiation light received by the third light receiving unit and the

transmitted light intensity I_2 of the irradiation light received by the second light receiving unit, and

the supply amount control unit controls the supply amount of the corrosion inhibitor, based on the absorbance and/or the transmittance of the first and third measurement targets calculated by the calculation unit.

3. A corrosion prevention method comprising:

emitting irradiation light in an absorption wavelength band that includes an absorption spectrum of a first measurement target produced by combustion of a combustion object, and irradiation light in an absorption wavelength band that includes an absorption spectrum which is an absorption spectrum of a second measurement target produced by combustion of the combustion object and is different from the absorption spectrum of the first measurement target, from a first light source unit or a second light source unit each provided with a light emitting diode toward a combustion gas generated by combustion of the combustion object;

receiving the irradiation light emitted from the first light source unit and the irradiation light emitted from the second light source unit by a first light receiving unit or a second light receiving unit;

calculating absorbance and/or transmittance of the first measurement target by a calculation unit, based on transmitted

light intensity I_1 of the irradiation light received by the first light receiving unit and transmitted light intensity I_2 of the irradiation light received by the second light receiving unit;

controlling a supply amount of a corrosion inhibitor that reacts with the first measurement target, based on the absorbance and/or the transmittance of the first measurement target calculated by the calculation unit; and

supplying the corrosion inhibitor to the combustion gas.

4. The corrosion prevention method according to claim 3, further comprising:

emitting irradiation light in an absorption wavelength band that includes an absorption spectrum which is an absorption spectrum of a third measurement target produced from the corrosion inhibitor and is different from the absorption spectra of the first and second measurement targets, from a third light source unit provided with a light emitting diode toward the combustion gas;

receiving the irradiation light emitted from the third light source unit by a third light receiving unit;

calculating absorbance and/or transmittance of the third measurement target by the calculation unit, based on transmitted light intensity I_3 of the irradiation light received by the third light receiving unit and the transmitted light intensity I_2 of

the irradiation light received by the second light receiving unit;

controlling the supply amount of the corrosion inhibitor that reacts with the first measurement target, based on the absorbance and/or the transmittance of the first and third measurement targets calculated by the calculation unit; and

supplying the corrosion inhibitor to the combustion gas.