[CLAIMS]

[Claim 1]

An exhaust gas treatment system comprising:

a reactor into which exhaust gas is introduced; ~~and~~

a first spraying unit ~~treatment unit provided inside the reactor and~~ spraying ~~a cooling liquid and an~~seawater or aqueous absorbent(regulated gas-lean absorbent) into the inside of the reactor;~~, or an aqueous absorbent, onto exhaust gas to remove carbon dioxide from the exhaust gas,~~

a packing contacting the exhaust gas passing through the first spraying unit; and

a second spraying unit spraying the aqueous absorbent into the exhaust gas passing through the packing,

wherein the aqueous absorbent is an aqueous alkaline solution,~~ which chemically adsorbs carbon dioxide contained in the exhaust gas, thereby removing carbon dioxide from the exhaust gas, and regulated gas-rich absorbent, which is the cooling liquid or the aqueous absorbent sprayed into the exhaust gas and used to remove carbon dioxide from the exhaust gas, is drained or recovered so that the aqueous absorbent is separated from the regulated gas-rich absorbent~~

the exhaust gas treatment system operates in an open loop state or in a closed loop state, and

in the open loop state, the first spraying unit sprays seater and the second spraying unit sprays the aqueous

absorbent, and in the closed loop state, both the first spraying unit and the second spraying unit spray the aqueous absorbent.

~~[Claim 2]~~

~~The exhaust gas treatment system of claim 1, wherein the exhaust gas is cooled to 100°C or lower, before the exhaust gas is introduced into the reactor or before the aqueous absorbent is sprayed inside the reactor.~~

~~[Claim 3]~~

~~The exhaust gas treatment system of claim 2, further comprising a heat recovery unit recovering heat from the exhaust gas before the exhaust gas is introduced into the reactor, to cool the exhaust gas.~~

[Claim 24]

The exhaust gas treatment system of claim 12, further comprising ~~wherein the treatment unit includes:~~

~~a first spraying unit spraying the cooling liquid or the aqueous absorbent into the exhaust gas;~~

~~a second spraying unit spraying the aqueous absorbent into the exhaust gas; and~~

an aqueous absorbent tank storing the aqueous absorbent and connected to the first spraying unit and the second spraying unit to supply the aqueous absorbent thereto.

~~[Claim 5]~~

~~The exhaust gas treatment system of claim 4, wherein the cooling liquid is seawater.~~

[Claim 3~~6~~]

The exhaust gas treatment system of claim 2~~5~~, wherein the reactor includes an exhaust gas inlet through which the exhaust gas is introduced, and a regulated gas-rich absorbent drain port through which regulated gas-rich absorbent, the seawater or the aqueous absorbent used to treat the exhaust gas, is drained, and

a regulated gas-rich absorbent drainage line, and a regulated gas-rich absorbent recovery line connected to the aqueous absorbent tank, are connected to the regulated gas-rich absorbent drain port, respectively~~at least a portion of the first spraying unit is provided in a portion inside the reactor next to the exhaust gas inlet in a flow direction of the exhaust gas, and at least a portion of the second spraying unit is provided in a portion inside the reactor next to the first spraying unit in the flow direction of the exhaust gas~~.

~~[Claim 7]~~

~~The exhaust gas treatment system of claim 6, wherein the reactor includes a regulated gas-rich absorbent drain port through which regulated gas-rich absorbent is drained, and a~~

~~regulated gas-rich absorbent drainage line and a regulated gas-rich absorbent recovery line connected to the aqueous absorbent tank are connected to the regulated gas-rich absorbent drain port.~~

[Claim 4~~8~~]

The exhaust gas treatment system of claim 3~~7~~, wherein a~~the~~ regulated gas-rich absorbent recovery valve included in the regulated gas-rich absorbent recovery line is closed and a ~~drainage line includes a~~ regulated gas-rich absorbent drainage valve~~, and the regulated gas-rich absorbent recovery line includes a regulated gas-rich absorbent recovery valve and a regulated gas-rich absorbent recovery pump~~ included in the regulated gas-rich absorbent drainage line is opened to enter the open loop state, or the regulated gas-rich absorbent drainage valve is closed and the regulated gas-rich absorbent valve is opened to enter the closed loop state.

[Claim 5~~9~~]

The exhaust gas treatment system of claim 2~~8~~, ~~wherein the treatment unit~~ further comprising ~~includes~~ a third spraying unit spraying the ~~an~~ aqueous absorbent into the exhaust gas passing through~~, at least a portion thereof being provided in a portion inside the reactor next to~~ the second spraying unit~~ in the flow direction of the exhaust gas~~.

[Claim 6~~10~~]

The exhaust gas treatment system of claim 5~~9~~, wherein the first, second, and third spraying units include first, second, and third supply pipes in which at least portions of one sides are provided inside the reactor and the other sides are connected to the aqueous absorbent tank, respectively, and a seawater spray supply line connected to a seawater source is connected to the first supply pipe.

[Claim 7~~11~~]

The exhaust gas treatment system of claim 6~~10~~, wherein the seawater spray supply line includes a seawater spray supply valve and a seawater spray supply pump, the first, second, and third supply pipes include first, second, and third aqueous absorbent supply valves, respectively, an aqueous absorbent supply line including an aqueous absorbent supply pump is connected to the aqueous absorbent tank, and the other sides of the first, second, and third supply pipes are connected to the aqueous absorbent supply line.

[Claim 8~~12~~]

The exhaust gas treatment system of claim 7~~11~~, wherein the first, second, and third spraying units further include first, second, and third spray nozzles respectively provided in

portions of the first, second, and third supply pipes provided inside the reactor.

~~[Claim 13]~~

~~The exhaust gas treatment system of claim 12, wherein the regulated gas-rich absorbent recovery valve is closed and the regulated gas-rich absorbent drainage valve is opened to enter an open loop state, or the regulated gas-rich absorbent drainage valve is closed and the regulated gas-rich absorbent recovery valve is opened to enter a closed loop state.~~

~~[Claim 14]~~

~~The exhaust gas treatment system of claim 13, wherein, in the open loop state, the first aqueous absorbent supply valve is closed, the seawater spray supply valve and the second and third aqueous absorbent supply valves are opened, and the seawater spray supply pump and the aqueous absorbent supply pump are operated so that seawater is sprayed from the first spray nozzle, the aqueous absorbent is sprayed from the second and third spray nozzles, and regulated gas-rich absorbent is discharged through the regulated gas-rich absorbent drainage line.~~

~~[Claim 15]~~

~~The exhaust gas treatment system of claim 13, wherein, in the closed loop state, the seawater spray supply valve is closed, at least one of the first, second, and third aqueous absorbent supply valves is opened, and the aqueous absorbent supply pump and the regulated gas-rich absorbent recovery pump are operated, so that the aqueous absorbent is sprayed from at least one of the first, second, and third spray nozzles, and regulated gas-rich absorbent is recovered through the regulated gas-rich absorbent recovery line.~~

~~[Claim 16]~~

~~The exhaust gas treatment system of claim 15, wherein the first aqueous absorbent supply valve is closed, the seawater spray supply valve is opened, and the seawater spray supply pump is operated, as necessary, so that seawater is sprayed through the first spray nozzle.~~

[Claim 9~~17~~]

The exhaust gas treatment system of claim 2~~4~~, ~~wherein the treatment unit~~ further comprising ~~includes~~ an aqueous absorbent preparing unit connected to the aqueous absorbent tank, and preparing the~~an~~ aqueous absorbent~~,~~ and supplying the prepared aqueous absorbent to the aqueous absorbent tank.

~~[Claim 18]~~

The exhaust gas treatment system of claim 17, wherein the aqueous absorbent preparing unit prepares an aqueous alkaline solution as an aqueous absorbent by mixing at least one of seawater and fresh water with an alkaline agent.

[Claim 19]

An exhaust gas treatment system comprising:

a reactor into which exhaust gas is introduced; and

a heat recovery unit recovering heat from the exhaust gas before the exhaust gas is introduced into the reactor,

wherein the exhaust gas is cooled to 100°C or lower by the heat recovery unit.

[Claim 20]

An exhaust gas treatment system comprising:

a reactor into which exhaust gas is introduced; and

a treatment unit provided inside the reactor and spraying an aqueous absorbent into the exhaust gas to remove carbon dioxide from the exhaust gas,

wherein the treatment unit includes an aqueous absorbent preparing unit preparing and supplying the aqueous absorbent, and the aqueous absorbent preparing unit prepares the aqueous absorbent by mixing seawater with an alkaline agent.

~~[Claim 21]~~

~~An exhaust gas treatment system comprising:~~

~~a reactor into which exhaust gas is introduced; and~~

~~a treatment unit provided inside the reactor and spraying an aqueous absorbent into the exhaust gas to remove carbon dioxide from the exhaust gas,~~

~~wherein the treatment unit includes an aqueous absorbent preparing unit preparing and supplying an aqueous absorbent, the aqueous absorbent preparing unit prepares the aqueous absorbent by mixing seawater with an alkaline agent, the aqueous absorbent preparing unit includes a seawater tank in which seawater is stored, and the seawater tank receives seawater from a seawater source and stores the seawater.~~

[Claim 10~~22~~]

A ship comprising:

a hull; and

the exhaust gas treatment system according to any one of claims 1 to 9~~21~~, provided in the hull.