WHAT IS CLAIMED IS:

1. A gas management assembly for a high pressure heat-treatment apparatus, the assembly comprising:

a housing having an inner space;

a gas supply module disposed in the inner space and configured to supply a gas to internal and external chambers of the high pressure heat-treatment apparatus;

a gas exhaust module disposed in the inner space and configured to exhaust the gas caused by heat treatment of an object from the internal chamber;

a detection module connected to the gas exhaust module in the inner space and configured to detect residual gas remaining in the internal chamber; and

a control module configured to control at least one of the gas supply module and the gas exhaust module based on a detection result of the residual gas by the detection module,

wherein the gas exhaust module includes a gas exhaust line communicating with the internal chamber to guide the gas from the internal chamber to the outside, and

the detection module includes

a branch line branching from the gas exhaust line in the inner space,

a detection valve installed in the branch line and disposed in the inner space, and

a gas detector configured to detect the residual gas from a flow of the gas flowing from the internal chamber as the detection valve is opened.

2. The assembly of claim 1, wherein the gas detector is disposed outside the housing.

3. The assembly of claim 1, wherein the gas detector includes at least one of an active gas detector and an inflow gas detector,

the active gas detector is configured to detect an active gas injected into the internal chamber to act on the object, and

the inflow gas detector is configured to detect an inflow gas flowing into the internal chamber from the outside.

4. The assembly of claim 3, wherein the detection module further includes a pressure regulator disposed before the active gas detector and configured to lower a pressure of the flow of the gas flowing into the active gas detector to a reference pressure or less.

5. The assembly of claim 3, wherein the control module is configured to control the active gas detector to be operated after the heat treatment of the object, and

control the inflow gas detector to be operated before the heat treatment of the object.

6. The assembly of claim 1, wherein the control module is configured to control the gas supply module to supply an inert gas to the internal chamber when operating the gas detector.

7. The assembly of claim 1, further comprising a discharge module configured to discharge a gas from the inner space,

wherein the gas detector communicates with the discharge module.

8. The assembly of claim 7, further comprising an inflow module configured to allow external air to flow into the inner space,

wherein the discharge module is configured to discharge the external air flown into the inner space.

9. The assembly of claim 8, further comprising a sensing module configured to sense an environment of the inner space,

wherein the control module is configured to stop gas supply performed by the gas supply module when determining that gas leak occurs in the inner space from a sensed result by the sensing module.

10. A gas management assembly for a high pressure heat-treatment apparatus, the assembly comprising:

a housing having an inner space;

a gas exhaust module disposed in the inner space and configured to exhaust a gas caused by heat treatment of an object from a chamber of the high pressure heat-treatment apparatus;

a detection module connected to the gas exhaust module in the inner space and configured to detect the residual gas remaining in the chamber at at least one time point before and after the heat treatment of the object; and

a control module configured to operate the gas exhaust module to exhaust the gas from the chamber based on a detection result of the residual gas by the detection module,

wherein the gas exhaust module has a gas exhaust line communicating with the chamber to guide the gas from the chamber to the outside, and

the detection module includes

a branch line branching from the gas exhaust line in the inner space,

a detection valve installed in the branch line and disposed in the inner space, and

a gas detector configured to detect the residual gas from a flow of the gas flowing from the chamber as the detection valve is opened.

11. The assembly of claim 10, wherein the gas detector is disposed outside the housing.

12. The assembly of claim 10, wherein the gas detector includes at least one of an active gas detector and an inflow gas detector,

the active gas detector is configured to detect an active gas injected into the chamber to act on the object, and

the inflow gas detector is configured to detect an inflow gas flowing into the chamber from the outside.

13. The assembly of claim 10, further comprising:

a gas supply module disposed in the inner space and configured to supply the gas for the heat treatment of the object to the chamber; and

a sensing module configured to sense an environment of the inner space,

wherein the control module is configured to stop gas supply performed by the gas supply module when determining that gas leak occurs in the inner space from a sensed result by the sensing module.

14. The assembly of claim 10, further comprising a discharge module configured to discharge a gas from the inner space under control of the control module,

wherein the gas detector communicates with the discharge module.