CLAIMS

1. A laminating-printing system in which ~~heat is supplied to a powder material using~~ energy rays are irradiated in ~~the presence of~~a chamber filled with a ~~shield~~shielding gas ~~to print layers, and the layers are sequentially laminated to produce a laminated-printed object~~,

wherein the laminating-printing system comprises:

a laminating-printing unit which ~~prints~~supplies heat to a powder material using the energy rays to print layers, and sequentially ~~laminates~~laminate the layers~~; and~~ to produce a laminated-printed object;

a concentration adjusting unit which adjusts the concentration of gas components in the shield gas;

a first supply line which supplies a part of the shield gas in the chamber into the concentration adjusting unit; and

a second supply line which supplies again the shield gas which is supplied into the concentration adjusting unit through the first supply line into the chamber;

wherein the laminating-printing unit comprises:

an irradiation section ~~including~~comprising an irradiation source of the energy rays ~~to irradiate the powder material~~, and

a printing section ~~including a~~ comprising the chamber ~~filled with the shield gas~~ and a printing stage on which the layers are printed and laminated, ~~and~~

wherein the concentration adjusting unit comprises:

a purification section which removes a first gas component which is an impurity in the shield gas based on the powder material; and

a supply section which supplies a second gas component selected based on the

powder material inside of the chamber as needed~~.~~, wherein the second supply line supplies a gas obtained by removing the first gas component from a part of the shield gas by the purification section into the chamber; and wherein the supply section further comprises a third supply line which supplies the second gas component into the gas in the second supply line as needed.

2. The laminating-printing system according to Claim 1, ~~wherein the laminating-printing system further comprises a first supply line which supplies a part of the shield gas in the chamber into the purification section, and~~ wherein the purification section comprises at least one selected from the group consisting of the following first purification tower, second purification tower, third purification tower, and fourth purification tower, which are connected with the first supply line:

a first purification tower: a purification tower which removes oxygen from the shield gas, and is provided with a first bypass line which connects a primary side and a secondary side of the first purification tower;

a second purification tower: a purification tower which removes water from the shield gas, and is provided with a second bypass line which connects a primary side and a secondary side of the second purification tower;

a third purification tower: a purification tower which removes nitrogen from the shield gas, and is provided with a third bypass line which connects a primary side and a secondary side of the third purification tower;

a fourth purification tower: a purification tower which removes water and does not remove oxygen from the shield gas~~.~~, and is provided with a fourth bypass line which connects a primary side and a secondary side of the fourth purification tower;

3. The laminating-printing system according to Claim 1 or 2,

~~wherein the purification section further comprises at least one selected from the group consisting of the following first bypass line, second bypass line, third bypass line, and fourth bypass line:~~

~~first bypass line: bypass line in which the shield gas supplied from the first supply line is supplied to the secondary side of the first purification tower without being supplied to the first purification tower;~~

~~second bypass line: bypass line in which the shield gas supplied from the first supply line is supplied to the secondary side of the second purification tower without being supplied to the second purification tower;~~

~~third bypass line: bypass line in which the shield gas supplied from the first supply line is supplied to the secondary side of the third purification tower without being supplied to the third purification tower;~~

~~fourth bypass line: bypass line in which the shield gas supplied from the first supply line is supplied to the secondary side of the fourth purification tower without being supplied to the fourth purification tower.~~

~~4. The laminating-printing system according to any one of Claims 1 to 3,~~

wherein the supply section comprises a source of a second gas component which is at least one selected from the group consisting of hydrogen, oxygen, carbon monoxide, carbon dioxide, and ammonia.

~~5. The laminating-printing system according to any one of Claims 1 to 4,~~

~~wherein the laminating-printing system further comprises:~~

~~a second supply line which supplies gas from which the first gas component has been removed from the shield gas by the purification section into the chamber; and~~

~~a third supply line which supplies the second gas component to the gas in the second supply line as needed.~~

~~6~~4. A laminating-printing method in which heat is supplied to a powder material using energy rays in the presence of a shield gas to print layers, and the layers are sequentially laminated to produce a laminated-printed object,

wherein the laminating-printing method comprises:

a step (a) of printing the layers and sequentially laminating the printed layers; and

a step (b) of adjusting the concentration of gas components in the shield gas, and

wherein, in the step (a), the powder material in the chamber is irradiated with the energy rays, ~~a~~the layer is printed in the chamber, and printed layers are sequentially laminated, and

in the step (b), after a part of the shielding gas in the chamber is introduced outside the chamber, a first gas component which is an impurity in the shield gas is removed from the shielding gas outside the chamber based on the powder material, and then a second gas component which is selected based on the powder material is supplied to the gas obtained by removing the first gas component from the shield gas as needed outside the chamber, and then the gas is supplied again into the chamber ~~as needed~~.

~~7~~5. A laminating-printing method according to Claim ~~6~~4,

wherein, in the step (b), at least one gas component selected from the group consisting of oxygen, water, and nitrogen is removed from the shield gas as the first gas

component.

~~8~~6. A laminating-printing method according to Claim ~~6~~4 or ~~7~~5,

wherein, in the step (b), at least one gas component selected from the group consisting of hydrogen, oxygen, carbon monoxide, carbon dioxide, and ammonia is supplied into the shield gas as the second gas component.

~~9~~7. A laminating-printing method according to any one of Claims ~~6~~4 to ~~8~~6,

wherein, in the step (b), the first gas component is changed based on the type of the powder material.

~~10~~8. A laminating-printing method according to any one of Claims ~~6~~4 to ~~9~~7,

wherein, in the step (b), the second gas component is supplied to gas from which the first gas component has been removed ~~in the step (b)~~ as needed.