

ION SOURCE LATERAL COOLING DEVICE

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] The present invention relates to an ion source lateral cooling device, and more particularly to a cooling device for cooling an ion source cavity by using a circulation cooling circuit and a heat conductor.

DESCRIPTION OF THE PRIOR ART

[0002] Ion implanters are commonly used in the fabrication of semiconductor wafers by generating an ion beam through an ion source and then directing the ion beam onto a wafer. When the ions collide with the wafer, a specific region of the wafer is doped by the ions, while the configuration of the doped region defines its functionality, and by using conductive interconnection, such wafers can be converted into complex circuits.

[0003] Generally, a large amount of thermal energy is generated in the process of generating the ion beam by an ion source cavity. However, in the prior art, in order to perform heat dissipation, radiation is used to dissipate heat for the ion implanter. But, because the heat dissipation rate of radiation is too low, in the long-term use, will result in the deterioration of service life of parts in the vicinity of the ion source cavity. Therefore, a related technique is urgently needed in this technical field that can effectively improve the heat dissipation efficiency of the ion implanter.

SUMMARY OF THE INVENTION

[0001] Therefore, in order to solve the problems disclosed above, an objective of the present invention is to provide an ion source lateral cooling device in which a cooling seat is connected to an ion source cavity, the thermal energy of the ion source cavity is conducted to the cooling seat through a heat conductor disposed on the cooling seat, and then the cooling seat is cooled by a circulation cooling circuit disposed inside the cooling seat to achieve a rapid cooling effect.

[0002] The present invention provides an ion source lateral cooling device for use in the technical field of ion implantation, which comprising:

[0003] an ion source cavity;

[0004] a cooling seat, any position at one end or one side of the cooling seat being connected to the ion source cavity, one end of the cooling seat being extendedly disposed with at least one attaching portion, the attaching portion being attached to any position at one side or one end of the ion source cavity, at least one circulation cooling circuit being disposed inside the cooling seat, and the circulation cooling circuit being disposed in the attaching portion and the cooling seat; and

[0005] a support base, one end of the support base being connected to the cooling seat, a circulation lead-in portion and a circulation lead-out portion being disposed inside the support base, and the circulation lead-in portion as well as the circulation lead-out portion communicating with the circulation cooling circuit.

[0006] Preferably, a heat conductor is disposed between the attaching portion and the ion source cavity, and two sides of the heat conductor are respectively attached with the attaching portion and the ion source cavity.

[0007] Preferably, a recessed portion is disposed inside the attaching portion, and the heat conductor is embedded in the recessed portion to be attached to the attaching portion and the ion source cavity.

[0008] Preferably, two sides of the ion source cavity are respectively attached with the two attaching portions, and the two attaching portions sandwich the ion source cavity at a central position of the cooling seat.

[0009] The present invention further discloses an ion source lateral cooling device for use in the technical field of ion implantation, which comprising:

[0010] an ion source cavity;

[0011] a cooling seat, any position at one end or one side of the cooling seat being connected to the ion source cavity, one end of the cooling seat being extendedly disposed with at least one attaching portion, the attaching portion being attached to any position at one side or one end of the ion source cavity, a heat conductor being disposed between the attaching portion and the ion source cavity, and two sides of the heat conductor being respectively attached with the attaching portion and the ion source cavity; and

[0012] a support base, one end of the support base being connected to the cooling seat.

[0013] Preferably, at least one circulation cooling circuit is disposed inside the cooling seat, and the circulation cooling circuit is disposed in the attaching portion and the cooling seat.

[0014] Preferably, a circulation lead-in portion and a circulation lead-out portion are disposed inside the support base, and the circulation lead-in portion as well as the circulation lead-out portion communicate with the circulation cooling circuit.

[0015] Preferably, a recessed portion is disposed inside the attaching portion, and the heat conductor is embedded in the recessed portion to be attached to the attaching portion and the ion source cavity.

[0016] Preferably, two sides of the ion source cavity are respectively attached with the two attaching portions, and the two attaching portions sandwich the ion source cavity at a central position of the cooling seat.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The techniques of the present invention would be more understandable from the detailed description given herein below and the accompanying figures are provided for better illustration, and thus description and figures are not limitative for the present invention, and wherein:

[0018] FIG. 1 is a perspective view of the present invention;

[0019] FIG. 2 is a perspective view of a cooling seat of the present invention;

[0020] FIG. 3 is an internal perspective view of the cooling seat of the present invention;

[0021] FIG. 4 is a cross-sectional view showing the state of use of the present invention;

and

[0022] FIG. 5 is a cross-sectional view showing another state of use of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0001] In order to make the objects, technical solutions and advantages of the present invention more clear, the present invention will be further described in detail below with reference to the drawings and embodiments. It should be understood that the specific embodiments described herein are merely illustrative of the present invention, but are not intended to limit the present invention.

[0002] Please refer to FIG. 1 to FIG. 5, which are respectively a perspective view, a

perspective view of a cooling seat, an internal perspective view of the cooling seat, a cross-sectional view showing the state of use, and a cross-sectional view showing another state of use of the present invention. As shown in the figures, the present invention discloses an ion source lateral cooling device, which is mainly composed of an ion source cavity 10, a cooling seat 20 and a support base 30, wherein the ion source cavity 10 and the cooling seat 20 are connected with each other, and the cooling seat 20 is connected to the support base 30. The ion source cavity 10 generates an ion beam by using an ion source. However, in the process of generating the ion beam, the ion source cavity 10 generates a large amount of thermal energy, thereby deteriorating the service life of the components. Therefore, the present invention further connects the cooling seat 20 to the ion source cavity 10, wherein the ion source cavity 10 is connected to any position at one end or one side of the cooling seat 20, one end of the cooling seat 20 is extendedly disposed with at least one attaching portion 201 (the following description is based on the two attaching portions 201 as an illustration), and the two attaching portions 201 are respectively attached to two sides of the ion source cavity 10 in order to sandwich the ion source cavity 10 at a central position of the cooling seat 20. Furthermore, a recessed portion 202 is disposed on an attachment surface of each of the attaching portions 201 that is attached with the ion source cavity 10, and a heat conductor 40 is disposed in the recessed portion 202, and therefore, two sides of the heat conductor 40 can be respectively attached to the attaching portion 201 and the ion source cavity 10 to effectively conduct the thermal energy of the ion source cavity 10 to the attaching portion 201.

[0003] In addition, at least one circulation cooling circuit 203 is disposed inside the cooling seat 20, and the circulation cooling circuit 203 is disposed in the attaching portion 201 and the cooling seat 20. A circulation lead-in portion 301 and a circulation lead-out portion 302 are disposed inside the support base 30, and the circulation lead-in portion 301 as well as the circulation lead-out portion 302 communicate with the circulation cooling circuit 203. In this way, a user can introduce a water body or a cooling body (the following description is based on the cooling body as an illustration) from the circulation lead-in portion 301, and the cooling body flows through the circulation cooling circuit 203 in the cooling seat 20 and the circulation cooling circuit 203 in the attaching portion 201. Therefore, when the heat conductor 40 conducts the thermal energy of the ion source cavity 10 to the attaching portion 201, the cooling body can be used for effectively reducing the temperature, and finally the cooling body is discharged from the circulation lead-out portion 302. Thus, deterioration of service life of the components due to

overheating of the ion source cavity 10 can be avoided.

[0004] The detailed description above is specifically for illustrating the embodiments of the present invention, and the embodiments are not intended to limit the claims of the present invention. Any equivalent implementations or modifications that are not departing from the technical spirit of the invention should be included in the claims of the present invention. Moreover, the present invention is not only innovative in terms of technical thinking, but also has the various above-mentioned efficacies that are not in the prior art.

What is claimed is:

1. An ion source lateral cooling device for use in the technical field of ion implantation, comprising:
 - an ion source cavity;
 - a cooling seat, any position at one end or one side of the cooling seat being connected to the ion source cavity, one end of the cooling seat being extendedly disposed with at least one attaching portion, the attaching portion being attached to any position at one side or one end of the ion source cavity, at least one circulation cooling circuit being disposed inside the cooling seat, and the circulation cooling circuit being disposed in the attaching portion and the cooling seat; and
 - a support base, one end of the support base being connected to the cooling seat, a circulation lead-in portion and a circulation lead-out portion being disposed inside the support base, and the circulation lead-in portion as well as the circulation lead-out portion communicating with the circulation cooling circuit.
2. The ion source lateral cooling device as claimed in claim 1, wherein a heat conductor is disposed between the attaching portion and the ion source cavity, and two sides of the heat conductor are respectively attached with the attaching portion and the ion source cavity.
3. The ion source lateral cooling device as claimed in claim 2, wherein a recessed portion is disposed inside the attaching portion, and the heat conductor is embedded in the recessed portion to be attached to the attaching portion and the ion source cavity.
4. The ion source lateral cooling device as claimed in claim 2, wherein two sides of the ion source cavity are respectively attached with the two attaching portions, and the two attaching portions sandwich the ion source cavity at a central position of the cooling seat.
5. An ion source lateral cooling device for use in the technical field of ion implantation, comprising:
 - an ion source cavity;
 - a cooling seat, any position at one end or one side of the cooling seat being connected to the ion source cavity, one end of the cooling seat being extendedly disposed with at least one attaching portion, the attaching portion being attached to any position at one side or

one end of the ion source cavity, a heat conductor being disposed between the attaching portion and the ion source cavity, and two sides of the heat conductor being respectively attached with the attaching portion and the ion source cavity; and

a support base, one end of the support base being connected to the cooling seat.

6. The ion source lateral cooling device as claimed in claim 5, wherein at least one circulation cooling circuit is disposed inside the cooling seat, and the circulation cooling circuit is disposed in the attaching portion and the cooling seat.
7. The ion source lateral cooling device as claimed in claim 6, wherein a circulation lead-in portion and a circulation lead-out portion are disposed inside the support base, and the circulation lead-in portion as well as the circulation lead-out portion communicate with the circulation cooling circuit.
8. The ion source lateral cooling device as claimed in claim 5, wherein a recessed portion is disposed inside the attaching portion, and the heat conductor is embedded in the recessed portion to be attached to the attaching portion and the ion source cavity.
9. The ion source lateral cooling device as claimed in claim 5, wherein two sides of the ion source cavity are respectively attached with the two attaching portions, and the two attaching portions sandwich the ion source cavity at a central position of the cooling seat.