CLAIMS:

1. A plasma CVD apparatus, comprising:

a chamber;

a holding part that holds a substrate to be deposited arranged inside said chamber;

a first direct-current power source connected electrically with said holding part;

a first anode arranged inside said chamber and arranged on one side of said holding part;

a first cathode arranged inside said chamber and arranged on one side of said holding part;

a second anode that is arranged inside said chamber and is arranged on the other side of said holding part;

a second cathode that is arranged inside said chamber and is arranged on the other side of said holding part;

a second direct-current power source connected electrically with said first anode;

a first alternating-current power source connected electrically with said first cathode;

a third direct-current power source connected electrically with said second anode;

a second alternating-current power source connected electrically with said second cathode;

a gas supply mechanism that supplies raw material gas to the inside of said chamber;

an evacuation mechanism for evacuating the inside of

said chamber; and

a control part that controls said first direct-current power source so as to apply a first voltage to said holding part in a pulse form of a cycle not less than 1/100 msec and not more than 1 msec and a DUTY cycle of not less than 10% and not more than 90%, wherein

said control part controls said first direct-current power source so as to apply a second voltage whose positive and negative are opposite to those of said first voltage, to said holding part in a period during the rest of the DUTY cycle when the first voltage is not applied to the holding part, and to form a film on the other surface of the substrate via the applied second voltage.

2. The plasma CVD apparatus according to claim 1, wherein

an absolute value of said second voltage lies in a range not less than 10% and not more than 60% of an absolute value of said first voltage.

3. The plasma CVD apparatus according to any one of claims 1 or 2, further comprising a plasma wall that is arranged inside said chamber, is provided so as to cover each of spaces between said substrate to be deposited held by said holding part, and said first anode and said first cathode, and is set as a floating potential.

4. A method for manufacturing a magnetic recording medium

using a plasma CVD apparatus according to any one of claims 1 to 3, comprising:

holding a substrate to be deposited on which at least a magnetic layer is formed on a nonmagnetic substrate by said holding part; and

making said raw material gas into a plasma state by discharge between said first cathode and said first anode inside said chamber, and causing this plasma to accelerate and collide with a surface of the substrate to be deposited held by said holding part to form a protective film containing carbon as a main component.

5. A method for depositing a film on a substrate to be deposited using a plasma CVD apparatus having a holding part that holds a substrate to be deposited, an anode and a cathode that are arranged both side of said holding part inside a chamber, comprising:

arranging both surface of said substrate to be deposited so as to face said anode and said cathode inside said chamber;

supplying raw material gas into said chamber, and applying a first direct-current voltage to said anode, and applying an alternating voltage to said cathode, and

applying a first voltage to said holding part in a pulse form of a cycle of not less than 1/100 msec and not more than 1 msec and a DUTY cycle of not less than 10% and not more than 90% inside said chamber,

applying a second voltage, which is opposite in positive and negative to the first voltage, to the holding part during the rest of the DUTY cycle when the first voltage is not applied to the holding part, and to form a film on the other surface of the substrate via the applied second voltage, the film is deposited on both sides of the substrate by accelerated collision of the raw material gas with the substrate to be deposited as a plasma state in the chamber.

6. The method for depositing a film according to claim 5, wherein

an absolute value of said second voltage lies in a range of not less than 10% and not more than 60% of an absolute value of said first voltage.

7. The method for depositing a film according to any one of claims 5 or 6, wherein

a current value flowing to said substrate to be deposited when said film is deposited onto said substrate to be deposited is not less than 1.2 times a current value that corresponds to said DUTY cycle of a current value flowing to said substrate to be deposited in a case where said first voltage is continuously applied to said holding part.

8. A method for manufacturing a magnetic recording medium on which a protective film is formed containing carbon as a main component after the step of forming at least a magnetic

layer on a nonmagnetic substrate, wherein

the protective film is formed by the method for depositing a film according to any one of claims 5 to 7.

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