According to a first aspect of the present invention, there is provided an arc deposition device, comprising:

- a cathode comprising a surface with the material that is to be evaporated,
- magnetic means that lead to a magnetic field over the surface,
- an anode for absorbing the electrons that are extracted out of the cathode during the evaporation process,
- a voltage source for putting the anode at least partly at positive potential relative to the cathode,

characterized in that

the anode in the vicinity of the cathode is designed in such a way that the magnetic field lines that exit from the surface of the cathode hit the anode if they do not exit from the surface at a central area of the cathode, and in that in the central area measures have been taken that essentially prevent its erosion during operation of the deposition device.

According to a second aspect of the present invention, there is provided a vacuum treatment device with a vacuum chamber and a substrate holder and with an arc deposition device according to the first aspect.

~~According to the invention, the aim is achieved with the arc deposition source according to claim 1. In the dependent claims, different advantageous embodiments of the inventive arc deposition source are described.~~

The ~~inventive~~ arc deposition source comprises a cathode (target), an anode and magnetic means that may enable the magnetic field lines to lead from the target surface to the anode in a short connection.

The anode is placed in the direct vicinity of the cathode so that the connection of the cathode with the anode may be~~is~~ ensured over magnetic field lines from any point of the target surface to be evaporated and which is subjected to erosion.

In this connection, the magnetic means are designed in such a way that the component parallel to the target surface is considerably larger than the component perpendicular to the target surface. Magnetic field forces of up to 500 Gauss can be used, i.e. considerably higher field forces than the magnetic field forces otherwise used in PVD technology.

The arc source thus described may exhibits, by comparison with the state of the art, higher coating rates with simultaneously very smooth layers.

The ~~inventive~~ arc source can even be operated in vacuum, with a high spark speed being achieved. The arc source is then operated in metal mode. The metal ions thus generated, such as e.g. Cr+, Ti+, can arrive undisturbed onto the substrate and be used for the purpose of metal ion etching. Operation with low discharge current is possible.

By means of so-called "pre-biasing", it is possible with the ~~inventive~~ anode to reliably adjust the ion energy.

The invention will now be explained by way of example and with the aid of the figures.

Figure 1 shows an arc deposition source according to the state of the art;
Figure 2 shows an arc deposition source according to the state of the art;
Figure 3 shows a first embodiment of an inventive arc deposition source;
Figure 4 shows a vacuum device with an inventive arc deposition source;

Claims

1. Arc deposition device, comprising:

- a cathode comprising a surface with the material that is to be evaporated,
- magnetic means that lead to a magnetic field over the surface,
- an anode for absorbing the electrons that are extracted out of the cathode during the evaporation process,
- a voltage source for putting the anode at least partly at positive potential relative to the cathode,

characterized in that

the anode in the vicinity of the cathode is designed in such a way that the magnetic field lines that exit from the surface of the cathode hit the anode if they do not exit from the surface at a central area of the cathode, and in that in the central area measures have been taken that essentially prevent its erosion during operation of the deposition device.

2. Arc deposition device according to claim 1, characterized in that the position and geometry of the anode in relation to the cathode are chosen in such a manner that the magnetic field lines hit the surface of the anode at an angle of over 45° and preferably essentially perpendicularly.

3. Arc deposition device according to claim 2, characterized in that the position and geometry of the anode in relation to the cathode are chosen in such a manner that the magnetic field lines and the electric field lines that hit the anode run essentially parallel to one another.

~~4. Arc deposition device according to one of the preceding claims, characterized in that in the central area measures have been taken that essentially prevent its erosion during operation of the deposition device.~~

~~5.~~4. Arc deposition device according to claim 14, characterized in that the measures comprise a shutter in the central area of the cathode surface.

~~6.~~5. Vacuum treatment device with a vacuum chamber and a substrate holder and with an arc deposition device according to one of the preceding claims.

~~7.~~6. Vacuum treatment chamber according to claim 5~~6~~, characterized in that the cathode of the arc deposition device is kept in relation to the vacuum chamber on one potential that is floating, at the same polarity or positive.