CLAIMS

1. Method for implanting mono- or multi-charged ions on a surface of an object to be treated placed in a vacuum chamber, this method comprising the step that consists simultaneously of:

- injecting into the vacuum chamber a beam of ions produced by a source of ions and directing this beam of ions towards the surface of the object to be treated, and

- illuminating the surface of the object to be treated by means of a source of ultraviolet radiation producing ultraviolet radiation that propagates in the vacuum chamber,

wherein the atmospheric pressure inside the vacuum chamber is between 10^4 Pa and 10^{-4} Pa,

wherein the material from which the object to be treated is produced is chosen from the group formed by natural and synthetic sapphires, mineral glasses, polymers, ceramics, crystalline or amorphous metal alloys, and precious and non-precious metals.

2. Method according to claim 1, characterised in that source of ions is of the electron cyclotron resonance type.

3. Method according to claim 1, characterised in that, during the ion implantation process, a gas is injected into the vacuum chamber.

4. Method according to claim 2, characterised in that, during the ion implantation process, a gas is injected into the vacuum chamber.

5. Method according to claim 3, characterised in that the injected gas is a noble gas.

6. Method according to claim 4, characterised in that the injected gas is a noble gas.

7. Method according to claim 1, characterised in that the atmospheric pressure inside the vacuum chamber is between 10^{-2} Pa and 10^{-4} Pa.

8. Method according to any of claims 1 to 7, characterised in that the surface of the object to be treated is illuminated by means of a second source of ultraviolet radiation producing a second ultraviolet radiation that propagates in the vacuum chamber in a direction forming an angle with the first ultraviolet radiation.

9. Method according to claim 1, characterised in that the atoms that are implanted in the

surface of the object to be treated by means of the source of ions are chosen from the group formed by nitrogen N, carbon C, oxygen O, argon Ar, helium He and neon Ne.

10. Method according to claim 1, characterised in that the surface of the object to be treated is treated by means of an ion implantation dose that is situated in a range lying between $1*10^{14}$ ions·cm^{-2} and $7.5*10^{17}$ ions·cm^{-2}, and in that the acceleration voltage of the ions is between 7.5 kV and 40 kV.

11. Method according to claim 10, characterised in that the ion implantation dose is situated in a range lying between $1*10^{16}$ ions·cm^{-2} and $15*10^{16}$ ions·cm^{-2}.

12. Installation for the implantation of mono- or multi-charged ions in a surface of an object to be treated,

this installation comprising a vacuum chamber in which the object to be treated is disposed,

the installation also comprising a source of ions that injects a beam of ions into the vacuum chamber, this beam of ions being directed towards the surface of the object to be treated,

the installation also comprising a source of ultraviolet radiation producing ultraviolet radiation that propagates in the vacuum chamber and illuminates the object to be treated,

the source of ions and the source of ultraviolet radiation being arranged to function simultaneously,

wherein the atmospheric pressure inside the vacuum chamber is between 10^{4} and 10^{-4} Pa.

13. Installation for the implantation of mono- or multi-charged ions according to claim 12, characterised in that the source of ions is of the electron cyclotron resonance type.

14. Installation for the implantation of mono- or multi-charged ions according to either claim 12 or claim 13, characterised in that it comprises a source of gas that delivers gas into the vacuum chamber via an inlet valve to which the source of gas is connected.

15. Installation for the implantation of mono- or multi-charged ions according to claim 14, characterised in that the gas contained in the source of gas is a noble gas.

16. Installation for the implantation of mono- or multi-charged ions according to claim 12, characterised in that it produces an ion implantation dose in a range lying between $1*10^{14}$

ions·cm^{-2} and 7.5*10^{17} ions·cm^{-2}, and in that the acceleration voltage of the ions is between 7.5 kV and 40 kV.

17. Installation for the implantation of mono- or multi-charged ions according to claim 16, characterised in that the ion implantation dose is in a range lying between 1*10^{16} ions·cm^{-2} and 15*10^{16} ions·cm^{-2}.

18. Installation for the implantation of mono- or multi-charged ions according to claim 12, characterised in that the atmospheric pressure inside the vacuum chamber is between 10^{-2} Pa and 10^{-4} Pa.

19. Installation for the implantation of mono- or multi-charged ions according to claim 12, characterised in that it comprises a second source of ultraviolet radiation that illuminates the surface of the object to be treated with a second ultraviolet radiation that propagates in the vacuum chamber in a direction forming an angle with the first ultraviolet radiation.