CLAIMS

1. A source for generating ionizing radiation, comprising:

a vacuum chamber;

a cathode that is able to emit an electron beam into the vacuum chamber;

an anode that receives the electron beam and that comprises a target that is able to generate ionizing radiation from the energy received from the electron beam; and

an electrode that is placed in the vicinity of the cathode and forming a wehnelt, wherein the electrode is formed from a conductive surface adhering to a concave face of a dielectric.

2. The source according to claim 1, further comprising a mechanical part that is made from the dielectric, and that comprises the concave face.

3. The source according to claim 2, wherein the conductive surface is formed from a metal deposit placed on the concave face.

4. The source according to claim 2, wherein the mechanical part comprises an internal face having a surface resistivity comprised between 1×10^{9} Ω·square and 1×10^{13} Ω·square.

5. The source according to claim 4, wherein the surface resistivity of the internal face is obtained by depositing a semiconductor on the dielectric of the mechanical part.

6. A process for producing a source according to claim 4, comprising:

assembling with the mechanical part, by translation along an axis of the electron beam, the anode in a first direction along said axis of said translation,

and, the cathode along a second direction opposite to said first direction, a cavity formed by the concave face being closed by a stopper.

7. The source according to claim 2 , wherein the mechanical part forms a holder of the cathode.

8. The source according to claim 2, wherein the mechanical part forms a portion of the vacuum chamber.

9. The source according to claim 2, wherein the mechanical part forms a holder of the anode.

10. The source according to claim 2, wherein the mechanical part comprises an interior-conic-frustum-shaped exterior surface, in that the source comprises a holder an exterior-conic-frustum-shaped surface of which is complementary to the interior-conic-frustum-shaped exterior surface and at least one high-voltage contact supplying the cathode and in that the contact and the conic-frustum-shaped surfaces form a high-voltage connector of the source.

11. The source according to claim 10, further comprising a supple joint placed between the conic-frustum-shaped surface of the holder and the conic-frustum-shaped surface of the mechanical part, wherein the conic-frustum-shaped surface of the holder has an angle at the apex that is more open than the conic-frustum-shaped surface of the mechanical part and wherein the high-voltage connector is configured so that air located between the two conic-frustum-shaped surfaces escapes from the interior of the high-voltage connector into a cavity that is not subject to an electric field generated by a high-voltage transported by the connector.

12. The source according to claim 10, wherein the mechanical part comprises an exterior-conic-frustum-shaped exterior surface, and in that the

holder comprises an interior-conic-frustum-shaped surface that is complementary to the exterior-conic-frustum-shaped exterior surface.

13. The source according to claim 2 , wherein the anode is sealably fastened to the mechanical part.

14. An assembly for generating ionizing radiation, comprising:

a plurality of sources according to claim 2, the sources being juxtaposed and immobile in the assembly; and

a driving module configured to switch each of the sources in a preset sequence, wherein the mechanical part is common to all the sources.

15. The assembly according to claim 14, wherein the sources are aligned on an axis passing through each of the cathodes and in that the electrode is common to the various sources.

16. The source according to claim 1, wherein the dielectric is formed from a nitride-based ceramic.

17. The source according to claim 16, wherein the surface resistivity of the internal face is obtained by adding to the volume of the nitride-based ceramic a material allowing the intrinsic resistivity of the nitride-based ceramic to be decreased.

18. The source according to claim 1, wherein the cathode emits the electron beam via a field effect and in that the electrode is placed in contact with the cathode.

19. The source according to claim 1, wherein the dielectric has a dielectric strength higher than 30 MV/m.

20. An assembly for generating ionizing radiation, comprising: a plurality of sources according to claim 1, the sources being juxtaposed and immobile in the assembly; and a driving module configured to switch each of the sources in a preset sequence.

21. The assembly according to claim 20, wherein the anodes of all the sources are common.