Patent claims

1. A method for producing x-ray markers (1), wherein at least one region (1) of a material layer (2) forming the x-ray marker (1) to be produced is pre-cut, such that said region (1) is connected via at least one web (20), which forms a predetermined breaking point (21), to a part (22) of the material layer (2) surrounding the region (1),

   wherein the predetermined breaking point (21) is arranged in a section (23) of the region (1) such that the predetermined breaking point (21) lies further inward in an extension direction (E) of the web (20) than two edge portions (1a, 1b) of the region (1) between which the section (23) is disposed, wherein the predetermined breaking point (21) is severed in order to detach the x-ray marker (1) from said part (22) of the material layer (2).

2. The method according to claim 1, **characterised in that** the material layer (2) is a metal foil or a metal tube made of radiopaque metal.

3. The method according to any one of the preceding claims, **characterised in that** a width (B) of the web (20) perpendicularly to the extension direction (E) is pre-cut in a range of from 1 µm to 20 µm.

4. The method according to any one of the preceding claims, **characterised in that**, during the pre-cutting, a gap (24) surrounding the region (1) is produced and in particular has a width ranging from 10 µm to 100 µm.

5. The method according to any one of the preceding claims, **characterised in that** the material layer (2) together with the pre-cut region (1) is contacted with an acid, such that a burr (25) produced during the pre-cutting at the region (1) is reduced, in particular is polished.

6. The method according to claim 6, **characterised in that** the material layer (2) treated with the acid is rinsed together with the pre-cut region (1) after the contacting with the acid.

7. The method according to any one of the preceding claims, **characterised in that** an outer surface of the region (1) connected to the material layer (2) is passivated for protection against corrosion, in particular by one of the following measures:
   - oxidation of the surface, wherein in particular the oxidation is a plasma-chemical oxidation, which in particular is carried out in an electrolyte; or
   - coating with a dielectric layer, wherein in particular a gas-phase deposition produces thin silicon oxide layers; or
   - contacting of the surface with an aqueous silicate mixture for producing an electrically insulating layer on the surface, wherein said layer comprises sodium silicates; or
   - application of a complete layer of parylene.

8. The method according to claim 7, **characterised in that** the region (1), in particular after the passivation, is separated from the part (22) of the material layer (2) surrounding the region (1), in particular by one of the following measures:
   - by the oxidation performed for passivation, wherein the predetermined breaking point (21) is fully oxidised and is thus severed; or
   - by vibrating the predetermined breaking point (21), in particular by exposing the predetermined breaking point (21) to ultrasonic waves (21).

9. An x-ray marker, wherein the x-ray marker (1) has a section (23) which is arranged such that a contact face of a breaking point (21) severed in order to produce the x-ray marker lies further inward than two edge portions (1a, 1b) of the x-ray marker (1) between which the section (23) is disposed.

10. The x-ray marker according to claim 9, wherein the marker has an oxide or silicate layer with a thickness of more than 0.5 µm.

11. A semifinished product (200) for producing an x-ray marker (1), in particular an x-ray marker (1) according to claims 9 or 10, wherein the semifinished product (200) is formed by a material layer (2), into which at least one region (1) of the material layer (2) forming the x-ray marker (1) to be produced is pre-cut, such that said region (1) is connected via a web (20), which is extended along an extension direction (E) and forms a predetermined breaking point (21), to the part (22) of the material layer (2) surrounding the region (1),

wherein the predetermined breaking point (21) is arranged in a section (23) of the region (1) so that the predetermined breaking point (21) lies further inward in the extension direction (E) of the web (20) than two edge portions (1a, 1b) of the region (1) between which the section (23) is disposed.

12. The semifinished product according to claim 11, wherein a width (B) of the web (20) perpendicular to the extension direction (E) lies in the range of from 1 µm to 20 µm.

13. A medical implant (100), in particular in the form of a framework, wherein the medical implant (100) comprises at least one x-ray marker (1) according to any one of claims 9 to 10.