Claims

1. A method for metallizing the rear side (5) of a semiconductor component (1), which semiconductor component (1) is part of a photovoltaic solar cell or a preliminary stage in the production process of a photovoltaic solar cell, comprising the following method steps:

   A applying at least one at least single-layer metal foil (7) onto the rear side (5) of the semiconductor component (1);

   B locally heating at least the metal foil (7) such that the metal foil (7) fuses momentarily in local areas,

   characterized in that

   a void (8) is formed, at least in regions, between the metal foil (7) and the rear side (5) of the semiconductor component (1), which void (8) is filled with a filler medium, which filler medium has an optical refractive index n of less than 1.4;

   a gas~~, preferably air or an inert gas, more particularly preferably a noble gas~~ is used as the filler medium and whereby

   in method step B, the void (8) is delimited by the metal foil (7), the rear side (5) of the semiconductor component (1), and the fused regions.

   ~~or~~

   ~~that an adhesive is used as the filler medium.~~

2. The method according to claim 1, characterized in that, the gas is air.

3. The method according to claim 1, characterized in that, the gas is an inert gas.

4. The method according to claim 1, characterized in that, the gas is a noble gas.

~~2~~5. The method according to any one of the preceding claims, characterized in that,

~~in method step B, the void (8) is delimited by the metal foil (7), the rear side (5) of the semiconductor component (1), and the fused regions, more particularly in that~~ at least one fused region is formed so as to enclose the void (8)~~, preferably that this fused region extends constantly along an outer edge, preferably all outer edges of the semiconductor component (1)~~.

6. The method according to claim 5,
characterized in that,

the fused region extends constantly along an outer edge of the semiconductor component.

7. The method according to claim 5,
characterized in that,

the fused region extends constantly along all outer edges of the semiconductor component (1).

~~3~~8. The method according to any one of the preceding claims,
characterized in that
a laser is used for the fusing in method step B.

~~4~~9. The method according to any one of the preceding claims,
characterized in that
in method step B, at least predetermined breaking points are simultaneously formed in the metal foil (7) during the fusing.

~~5~~10. The method according to any one of the preceding claims
characterized in that
in an additional method step C, at least predetermined breaking points are formed in the metal foil (7)~~, preferably the metal foil (7) is severed at the fusion regions of method step C~~.

11. The method according to claim 10
characterized in that
the metal foil (7) is severed at the fusion regions of method step C.

~~6~~12. The method according to any one of the preceding claims,
characterized in that
in a method step A-a, the metal foil (7) is fixed at points on the semiconductor component by local heating and, in an additional method step A-b before method step B, the filler medium~~, most particularly gas, preferably air,~~ is actively introduced between the semiconductor component (1) and the metal foil (7).

~~7~~13. The method according to any one of the preceding claims,
characterized in that
the rear side (5) of the semiconductor component (1) is structured in a method step A0 before the method step A, ~~preferably~~ using a nanoimprint method and/or dry- and/or wet-chemical methods and/or printing and/or lithography processes.

~~8~~14. The method according to any one of the preceding claims,
characterized in that
the void (8) is formed with an average thickness in the range of 10 nm to 1 µm~~, preferably 10 nm to 100 nm~~.

15 The method according to claim 14,
characterized in that
the void (8) is formed with an average thickness in the range of 10 nm to 100 nm.

~~9~~16. The method according to any one of the preceding claims,
characterized in that
the metal foil (22) in method step A is a structured metal foil.

~~10~~17. The method according to any one of the preceding claims,

characterized in that

the metal foil (7) in method step A is a dielectrically coated film~~, preferably the dielectric layer is formed with a thickness in the range of 5 nm to 500 nm, preferably 20 nm to 200 nm~~.

18. The method according claim 17,
characterized in that
the dielectrically coated film is formed with a thickness in the range of 5 nm to 500 nm,

19. The method according claim 17,
characterized in that
the dielectrically coated film is formed with a thickness in the range of 20 nm to 200 nm.

~~11~~20. A photovoltaic solar cell,
comprising at least one semiconductor layer (2), at least one interlayer (4) on one side of the semiconductor layer, and at least one metal foil (7),
characterized in that
the photovoltaic solar cell comprises, at least in regions, a void (8), which is filled with a filler medium, between the metal foil (7) and the rear side (5) of the semiconductor component (1), which filler medium has an optical refractive index of less than 1.4;

a gas~~, preferably air or an inert gas, more particularly preferably a noble gas~~ is used as the filler medium and whereby
the void (8) is delimited by the metal foil (7), the rear side (5) of the semiconductor component (1), and the fused regions.
~~or~~
~~that an adhesive is used as the filler medium.~~

21. The method according to claim 20, characterized in that, the gas is air.

22. The method according to claim 20, characterized in that, the gas is an inert gas.

23. The method according to claim 20, characterized in that, the gas is a noble gas.

~~12~~24. A machining table, in particular for carrying out a method according to any one of the preceding claims 1 to ~~10~~19,
which machining table (14) comprises a support region (15) for a semiconductor component (1), at least one fixing region (17) for a metal foil, and at least one blow-off opening (18), which blow-off opening (18) is connected to a blow-off channel (20) and is disposed between the fixing region (17) and the support region (15).

~~13~~25. The machining table according to claim ~~12~~24,
characterized in that
the fixing region (17) is designed to enclose the support region (15)~~, preferably as a suction duct, which suction duct is connected to a suction channel (19)~~.

26. The machining table according to claim 24,
characterized in that
the fixing region (17) is designed as a suction duct, the suction duct is connected to a suction channel (19).

~~14~~27. The machining table according to any one of claims ~~12 or 13~~24-26,
characterized in that
the support region (15) is designed as a depression such that, when a semiconductor component (1) is placed into the depression, the semiconductor component (1) and the surface of the machining table (14) laterally adjacent thereto form a planar surface.