

Claims

1. A photovoltaic device (1a-d) comprising:
 - a solar cell unit (2a; 2b) including:
 - 5 a working electrode comprising a light-absorbing layer (3),
 - a counter electrode including a porous conductive layer (6), and
 - a conducting medium for transferring charges between the counter electrode and the working electrode, and
 - a conductor (7) electrically connected to the porous conductive layer (6),
 - 10 characterized in that the solar cell unit (2a, 2b) comprises at least one adhering layer (8;8b;8a;16,17) arranged between the conductor (7) and the porous conductive layer (6) for attaching the conductor (7) to the porous conductive layer, and the adhering layer (8;8b;8a;16,17) comprises an adhesive (20) and conducting particles (22; 22a-b) distributed in the adhesive so that a conducting network is formed in the adhesive.
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2. The photovoltaic device according to claim 1, wherein the photovoltaic device (1a-b) comprises an encapsulation (9) enclosing the solar cell unit (2a; 2b), the encapsulation is provided with a penetration hole (12) comprising at least a part of said adhering layer (8;8b;8a;16,17) and the conductor (7) is attached to the adhering layer and
 - 20 extends on the outside of the encapsulation.
3. The photovoltaic device according to claim 2, wherein the encapsulation (9) comprises a gluing layer (11) for attaching the encapsulation to the solar cell unit (2a;2b), and the gluing layer (11) is made of the same material as said adhesive (20).
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4. The photovoltaic device according to any of the previous claims, wherein the solar cell unit (2a, 2b) comprises a non-porous conducting barrier (14) disposed between the conductor (7) and the porous conductive layer (6), and the at least one adhering layer comprises a first adhering layer (16) disposed between the porous conductive layer (6) and the conducting barrier (14) for attaching the conducting barrier (14) to the porous conductive layer (6), and a second adhering layer (17) arranged between the conducting barrier (14) and the conductor (7) for attaching the conductor to the conducting barrier (14).
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5. The photovoltaic device according to claim 4, wherein the photovoltaic device (1a-b) comprises an encapsulation (9) enclosing the solar cell unit (2a; 2b), and the encapsulation (9) surrounds the first and second adhering layers (16,17) and the conducting barrier (14).
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6. The photovoltaic device according to claim 4 or 5, wherein the conducting barrier (14) comprises titan or an alloy thereof.
- 5 7. The photovoltaic device according to any of the previous claims, wherein the thickness of said adhering layer (8;8b;8a;16,17) is at least 3 μm , and preferably at least 5 μm , and most preferably at least 10 μm .
- 10 8. The photovoltaic device according to any of the previous claims, wherein the adhering layer (8;8b;8a;16,17) comprises between 20 and 40 vol% of said conducting particles (22; 22a-b).
- 15 9. The photovoltaic device according to any of the previous claims, wherein at least 80 wt-% of said conducting particles (22; 22a-b) have a size of 5 μm or less, and preferably at least 80 wt-% of said conducting particles have a size of 3 μm or less.
- 20 10. The photovoltaic device according to any of the previous claims, wherein the adhering layer (8;8b;8a;16,17) comprises a mixture of conducting particles (22a) having a size less than 200 nm and conducting particles (22b) having a size larger than 1 μm .
- 25 11. The photovoltaic device according to any of the previous claims, wherein said adhesive (20) is polyethylene, or polypropylene, or ionomer or mixtures thereof.
- 30 12. The photovoltaic device according to claim 3, wherein said adhesive (20) and said gluing layer (11) comprises polyethylene.
- 35 13. The photovoltaic device according to any of the previous claims, wherein said conducting particles (22; 22a-b) comprises carbon.
- 40 14. The photovoltaic device according to any of the previous claims, wherein said conducting particles (22; 22a-b) comprises titanium or an alloy thereof.
15. The photovoltaic device according to any of the previous claims, wherein the solar cell unit (1a;1b) comprises:
 - a porous substrate (5) made of an insulating material,
 - a upper conductive layer (4) formed on one side of the porous substrate (5) for extracting photo-generated electrons from the light-absorbing layer (3), and
 - a second conductor (7b) in electrical contact with the upper conductive layer (4), a conducting part (23) of the porous substrate (5) comprises conducting material (24), and the photovoltaic device comprises at least one adhering layer (25;26,28) comprising said adhesive (2) including said conducting particles (22;22a,22b) and disposed between the second conductor (7b) and said conducting part (23) of the

porous substrate for attaching the second conductor (7b) to the porous substrate (5).