

SOLAR PANEL INSTALLATION STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a solar panel installation structure, particularly to a new solar panel structure which can be made by a solar cell and various construction lap joint plate.

2. Description of the Prior Art

Conventional solar panel is provided with a solar cell between two layers of glass, and then frame the periphery of the glass with a metal frame to prevent the solar cell from being damaged by external forces or moisture.

As shown in Figures 1 and 2, it is an embodiment of conventional solar panel installation, when solar panels are installed at a predetermined location or above a building, each solar panel b must be supported by a steel frame a, and then clamp each solar panel b by a plurality of clamping seats c, and finally the screws d is used to lock the clamping seats c and the steel frame a to complete the installation of the conventional solar panel. There is no interconnected structure between adjacent conventional solar

panels, because each solar panel b, b1, b2, b3 is independently assembled on the steel frame a, and the solar panels b, b1, b2, b3 and the steel frame a are locked and fixed together only by the clamping seats c.

Therefore, since each solar panel must bear its own wind pressure, if one solar panel has weak wind pressure strength due to assembly problems or a strong wind pressure on its position (windward side), it is very easy for the solar panel to be blown off, so the conventional solar panel has a disadvantage of insufficient resistance to wind pressure. When the conventional solar panel encounters a strong wind (such as a typhoon), you will see that many conventional solar panels are blown down by the strong wind near the place where the conventional solar panels are installed, and the solar panels which are blown off by strong wind will not only cause the problem of suspension of power generation, but also cause harm to the surrounding environment, and even lead to casualties and serious losses.

For this reason, the inventor of this invention, having much experience in the development and manufacturing of solar panels and metal building materials, understands and researches the problem of the foregoing conventional solar panel and hence devised this invention.

SUMMARY OF THE INVENTION

The purpose of the present invention is to provide an innovative solar panel structure that can be lapped into one stable structure, the present invention breaks the structure limitation that conventional solar panels must be arranged between two glass sheets and a frame, and the technical prejudice that conventional solar panels are all made into a frame type plate, finally created a new type of solar panel installation structure. The structural strength of each solar panel of the present invention can be greatly improved through the structural characteristics of the construction lap joint plate, and can quickly assemble multiple solar panels into one stable structure, so that the solar panel installation structure has better structural strength and integrity, to improve its ability to resist wind pressure. The solar panel of the present invention not only has low manufacturing cost and fast installation speed, but also enables each solar power plant to generate electricity earlier and increase revenue. Moreover, the solar panel of the present invention only needs to be directly rinsed by rain water to maintain its surface clean, and it can maintain the power generation efficiency of the solar cell without regular cleaning to reduce maintenance costs.

The solar panel installation structure in the present invention includes

at least a solar panel which is provided with a lap joint plate and a solar cell; said lap joint plate has a flat portion, a first joint portion and a second joint portion are provided on both sides of said flat portion, and said solar cell is arranged above the flat portion; an insulating layer is provided between said solar cell and said flat portion to avoid direct contact between the solar wafer and the flat portion; a protective layer is provided above said solar cell, the area of said protective layer is larger than the area of said solar cell, and the periphery of the protective layer extends to said flat portion to completely cover the solar cell; the inside of said protective layer is provided with a adhesive layer, so that said solar cell can be sealed between said insulating layer and said protective layer; a plurality of light collecting grooves are provided above said protective layer to concentrate an oblique sunlight on the solar cell, so the amount of electrons and electron holes of the solar cell can be increased, and the photoelectric transformation efficiency can be improved.

The solar panel installation structure of present invention, among which said light collecting grooves is composed of a flat bottom wall and a beveled side wall, said beveled side wall of the light collecting grooves can utilize light reflection and light refraction to let the oblique sunlight to be concentrated and irradiated on the surface of said solar cell.

The solar panel installation structure of present invention, among which said protective layer can be made of fluoropolymer, and said fluoropolymer may be polytetrafluoroethylene.

The solar panel installation structure of present invention, among which the heights of said first joint portion and said second joint portion are higher than said flat portion, so that rainwater can be collected and flow to the flat portion, and directly wash the solar cell above the flat portion.

The solar panel installation structure of present invention, among which the adjacent solar panels are combined with each other by the first joint portion of one solar panel and the second joint portion of the other solar panel. Said first joint portion and the second joint portion may be a snap-fit structure, a fixed structure and a fixed structure.

BRIEF DESCRIPTION OF DRAWINGS

This invention will be better understood by referring to the accompanying drawings, wherein:

FIG. 1 is a schematic diagram of a conventional solar panel installation structure;

FIG. 2 is a partially enlarged view of FIG. 1;

FIG. 3 is a perspective view of an embodiment in the present invention;

FIG. 4 is a cross-sectional view of FIG. 3;

FIG. 4A is a partially enlarged view of FIG. 4;

Fig. 5 is a first embodiment of the lap joint plate in the present invention;

FIG. 5A is a schematic diagram of the installation structure of FIG. 5;

FIG. 6 is a second embodiment of the lap joint plate in the present invention;

FIG. 6A is a schematic diagram of the installation structure of FIG. 6;

FIG. 7 is a third embodiment of the lap joint plate in the present invention;

FIG. 7A is a schematic diagram of the installation structure of FIG. 7;

Fig. 8 is a fourth embodiment of the lap joint plate in the present invention;

Fig. 8A is a schematic diagram of the installation structure of FIG. 8;

Fig. 9 is a fifth embodiment of the lap joint plate in the present invention;

Fig. 9A is a schematic diagram of the installation structure of FIG. 9;

Fig. 10 is a sixth embodiment of the lap joint plate in the present invention;

and

Fig. 10A is a schematic diagram of the installation structure of FIG 10.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred embodiments of a solar panel installation structure in the present invention, as shown in Fig. 1 to 10A, each solar panel S includes at least a lap joint plate 1 and a solar cell 2 as main components combined together.

As shown in Fig. 3 to 4A, said lap joint plate 1 has a flat portion 10, a first joint portion 11 and a second joint portion 12 are provided on both sides of said flat portion 10, and said solar cell 2 is arranged above the flat portion 10. The heights of said first joint portion 11 and said second joint portion 12 are higher than said flat portion 10, so that rainwater can be collected and flow to the flat portion 10, and directly wash the solar cell 2 above the flat portion 10. According to requirements, said solar cell 2 can be various types of solar wafer structures. An insulating layer 20 (such as a rubber film or a plastic film with heat insulation and electrical insulation functions) is provided between said solar cell 2 and said flat portion 10 to avoid direct contact between the solar wafer 2 and the flat portion 10, and to ensure the safety of the solar panel. Said solar cell 2 is provided with a plurality of wires 21, 21a, a control box 22 and a plurality of output wires 23, 23a. Said control box 22 connects said wires 21, 21a and said output wires 23, 23a respectively, and the output wires 23, 23a of adjacent solar cell 2

can be connected to each other, so that all solar cell 2 can be connected in series, and the electric energy generated by the solar cell 2 can be output to an external electrical equipment or a electricity storage equipment.

A protective layer 24 made of fluoropolymer is provided above said solar cell 2, the area of said protective layer 24 is larger than the area of said solar cell 2, and the periphery of the protective layer 24 extends to said flat portion 10 to completely cover the solar cell 2. The inside of said protective layer 24 is provided with a adhesive layer 25, so that said solar cell 2 can be sealed between said insulating layer 20 and said protective layer 24, and it also can prevent the solar cell 2 from contacting with external moisture to extend the service life of the solar cell 2 and to improve the safety of the solar cell 2. Said protective layer 24 made of fluoropolymer may be a polytetrafluoroethylene film (Teflon) which with chemically inert and harmless to organisms, and also has very good heat resistance, cold resistance, electrical insulation, chemical resistance, mechanical properties and light penetration. Understandably, said protective layer 24 can also be made of other materials with good heat resistance, cold resistance, electrical insulation, chemical resistance, mechanical properties, and light penetration, depending on the requirements.

A plurality of light collecting grooves 240 are provided above said protective layer 24, said light collecting grooves 240 is composed of a flat bottom wall and a beveled side wall, said beveled side wall of the light collecting grooves 240 can utilize light reflection and light refraction to let the oblique sunlight to be concentrated and irradiated on the surface of said solar cell 2 to increase the lumination of the solar cell 2, and the solar cell 2 can efficiently absorb sunlight in the wavelength range of $0.2\mu\text{m} \sim 1.2\mu\text{m}$. In this way, all the sunlight can be fully utilized to increase the amount of electrons and electron holes (negative charges and positive charges) of the solar cell 2 and improve the efficiency of the solar cell 2 in converting light energy into electrical energy.

As shown in Fig. 5, 6, 7, 8, 9 and 10, The solar panel S of the present invention can assemble the solar cell 2 with various construction lap joint plate 1 into one. As shown in Fig. 5A, 6A, 7A, 8A, 9A and 10A, when the solar power generation facility need to install a plurality of solar panels S, the user only needs to combine the first joint portion 11 and the second joint portion 12 of the adjacent solar panels S to quickly complete the connection and assembly of the solar panels S.

As shown in Fig. 5A and 6A, said first joint portion 11 and the second joint portion 12 may be a snap-fit structure, a snap-fit end 110 of the first

joint portion 11 of one solar panel S is buckled at a snap-fit groove 120 of the second joint portion 12 of the other solar panel S when two adjacent solar panels S are combined with each other. As shown in Fig. 7A, 8A and 9A, said first joint portion 11 and the second joint portion 12 may be a fixed structure, the first joint portion 11 of one solar panel S and the second joint portion 12 of the other solar panel S are superimposed on each other, and then the first joint portion 11 of one solar panel S and the second joint portion 12 of the other solar panel S are fixed by a fixing element when two adjacent solar panels S are combined with each other. As shown in Fig. 10A, said first joint portion 11 and the second joint portion 12 may be a stranded structure, the first joint portion 11 of one solar panel S and the second joint portion 12 of the other solar panel S are superimposed on each other, and then the first joint portion 11 of one solar panel S and the second joint portion 12 of the other solar panel S are twisted and fixed by a processing tool when two adjacent solar panels S are combined with each other. After the first joint portion 11 and the second joint portion 12 of the adjacent solar panels S are combined with each other by means of buckling, fixing, twisting, etc., other auxiliary fixing elements can also be provided to increase its assembly stability.

In summary, since the solar panel S of the present invention has the

function of lap assembly, the structural strength of each solar panel S can be greatly improved through the structural characteristics of the construction lap joint plate, and can quickly assemble multiple solar panels into one stable structure, so that the solar panel installation structure has better structural strength and integrity, to improve its ability to resist wind pressure, and also has excellent water diversion function. Moreover, the present invention seals and fixes the solar cell 2 on the lap joint plate 1 by the insulating layer 20 and the protective layer 24, which can protect the solar cell 2 from physical damage through the structural strength of the lap joint plate 1, and then the material properties of the protective layer 24 made of fluoropolymer are used to solve the problem that dirt such as bird droppings and dust easily adheres to the surface of the solar panel, and it is not easy to clean. It only needs to be washed directly by rain to maintain its surface clean, and it can maintain the power generation efficiency of the solar cell without regular cleaning to reduce maintenance costs. In addition, the protective layer 24 made of fluoropolymer of the present invention can utilize the plurality of light collecting grooves 240 to enhance the lumination of the solar cell 2 and the photoelectric transformation efficiency. The solar panel of the present invention not only has low manufacturing cost and fast installation speed, but also can improve the

power generation efficiency of the solar cell, so that each solar power plant can generate electricity earlier and increase revenue, and also has the best practicality, safety and economic benefits.

While the preferred embodiments of this invention have been described above, it will be recognized and understood that various modifications may be made therein and appended claims are intended to cover all such modifications that may fall within the spirit and scope of the invention.

CLAIMS

What is Claimed is:

1. A solar panel installation structure at least comprising:

a solar panel is provided with a lap joint plate and a solar cell; said lap joint plate has a flat portion, a first joint portion and a second joint portion are provided on both sides of said flat portion, and said solar cell is arranged above the flat portion; an insulating layer is provided between said solar cell and said flat portion to avoid direct contact between the solar cell and the flat portion; a protective layer is provided above said solar cell, an area of said protective layer is larger than an area of said solar cell, and a periphery of the protective layer extends to said flat portion to completely cover the solar cell; an inside of said protective layer is provided with an adhesive layer, so that said solar cell is sealed between said insulating layer and said protective layer; a plurality of light collecting grooves are provided above said protective layer to concentrate an oblique sunlight on the solar cell, so an amount of electrons and electron holes of the solar cell are increased, and a photoelectric transformation efficiency is improved;

wherein a height of said first joint portion and said second joint portion are higher than said flat portion, so that rainwater is collected and flow to the flat portion, and directly wash the solar cell above the flat portion.

2. The solar panel installation structure according to claim 1, wherein said light collecting grooves is composed of a flat bottom wall and a beveled side wall, said beveled side wall of the light collecting grooves utilizes light reflection and light refraction to let the oblique sunlight to be concentrated and irradiated on a surface of said solar cell.

3. The solar panel installation structure according to claim 1, wherein said protective layer is made of fluoropolymer.

4. The solar panel installation structure according to claim 3, wherein said fluoropolymer is polytetrafluoroethylene.

5. The solar panel installation structure according to claim 1, wherein said solar cell is provided with a plurality of wires, a control box and a plurality of output wires, said control box connects said wires and said output wires respectively, and the output wires of adjacent solar cell is connected to each other, so that all solar cell are connected in series, and an electric energy generated by the solar cell is output to an external electrical equipment or a electricity storage equipment.

6. The solar panel installation structure according to claim 1, wherein there are at least two said solar panels, and adjacent solar panels are combined with

each other by the first joint portion of one solar panel and the second joint portion of the other solar panel.

7. The solar panel installation structure according to claim 1, wherein there are at least two said solar panels, said first joint portion and the second joint portion is a snap-fit structure, a snap-fit end of the first joint portion of one solar panel is buckled at a snap-fit groove of the second joint portion of the other solar panel when two adjacent solar panels are combined with each other.

8. The solar panel installation structure according to claim 1, wherein there are at least two said solar panels, said first joint portion and the second joint portion is a fixed structure, the first joint portion of one solar panel and the second joint portion of the other solar panel are superimposed on each other, and then the first joint portion of one solar panel and the second joint portion of the other solar panel are fixed by a fixing element when two adjacent solar panels are combined with each other.

9. The solar panel installation structure according to claim 1, wherein there are at least two said solar panels, said first joint portion and the second joint portion is a stranded structure, the first joint portion of one solar panel and the second joint portion of the other solar panel are superimposed on each other,

and then the first joint portion of one solar panel and the second joint portion of the other solar panel are twisted and fixed by a processing tool when two adjacent solar panels are combined with each other.