United States Patent	12394848
Kind Code	B2
Date of Patent	August 19, 2025
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Battery module and battery pack including the same

Abstract

The present disclosure relates to a battery module and a battery pack including the same. A battery module according to an embodiment of the present disclosure may includes a battery cell stack in which a plurality of battery cells are stacked, a module frame arranged so as to wrap the battery cell stack, a busbar frame arranged so as to cover the front and rear surfaces of the battery cell stack that is exposed from the module frame, and an end plate arranged so as to cover the busbar frame. The module frame may includes a lower frame for covering the lower part and both side surfaces of the battery cell stack, and an upper plate for covering the upper part of the battery cell stack. At least one assembly guide part may be formed at an edge of the lower frame coupled to the upper plate.

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Appl. No.: **17/638311**

Filed (or PCT Filed): **March 11, 2021**

PCT No.: **PCT/KR2021/003029**

PCT Pub. No.: **WO2021/221306**

PCT Pub. Date: November 04, 2021

Prior Publication Data

Document Identifier	Publication Date
US 20220302540 A1	Sep. 22, 2022

Foreign Application Priority Data

KR 10-2020-0052264 Apr. 29, 2020

Publication Classification

Int. Cl.: **H01M50/264** (20210101); **H01M50/211** (20210101); **H01M50/502** (20210101)

U.S. Cl.:

CPC **H01M50/211** (20210101); **H01M50/264** (20210101); **H01M50/502** (20210101);

Field of Classification Search

CPC: H01M (50/211); H01M (50/502); H01M (50/264)

References Cited

U.S. PATENT DOCUMENTS

Patent No.	Issued Date	Patentee Name	U.S. Cl.	CPC
2011/0293973	12/2010	Kim	N/A	N/A
2012/0114999	12/2011	Park et al.	N/A	N/A
2014/0242449	12/2013	Lee et al.	N/A	N/A
2015/0037619	12/2014	Ahn	N/A	N/A
2017/0110698	12/2016	Kim et al.	N/A	N/A
2017/0190264	12/2016	Kim	N/A	H01M 50/242
2019/0001838	12/2018	Choi et al.	N/A	N/A
2019/0131596	12/2018	Yang et al.	N/A	N/A
2019/0198952	12/2018	Choi et al.	N/A	N/A
2020/0076025	12/2019	Jo et al.	N/A	N/A
2020/0176745	12/2019	Lee	N/A	N/A
2022/0231372	12/2021	Kim	N/A	N/A

FOREIGN PATENT DOCUMENTS

Patent No.	Application Date	Country	CPC
102263212	12/2010	CN	N/A
106941142	12/2016	CN	N/A
108463902	12/2017	CN	N/A
109920944	12/2018	CN	N/A
110915019	12/2019	CN	N/A
2014-170740	12/2013	JP	N/A
2015138620	12/2014	JP	N/A
20070080870	12/2006	KR	N/A
101191659	12/2011	KR	N/A
20150014846	12/2014	KR	N/A
20160071900	12/2015	KR	N/A
20170045580	12/2016	KR	N/A
2017-0082041	12/2016	KR	N/A
20190054709	12/2018	KR	N/A

20190078521	12/2018	KR	N/A
20190090189	12/2018	KR	N/A
102120933	12/2019	KR	N/A
2017169728	12/2016	WO	N/A
2019098491	12/2018	WO	N/A

OTHER PUBLICATIONS

International Search Report for Application No. PCT/KR2021/003029 mailed Jul. 7, 2021, pp. 1-3. cited by applicant
Extended European Search Report for Application No. 21797487.2 dated May 16, 2023. 7 pgs. cited by applicant

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Background/Summary

CROSS CITATION WITH RELATED APPLICATION(S)

(1) This application is a national phase entry under 35 U.S.C. § 371 of International Application No. PCT/KR2021/003029 filed on Mar. 11, 2021, which claims the benefit of Korean Patent Application No. 10-2020-0052264 filed on Apr. 29, 2020, with the Korean Intellectual Property Office, the disclosures of which are incorporated herein by reference in their entirety.

TECHNICAL FIELD

(2) The present disclosure relates to a battery module and a battery pack including the same, and more particularly, to a battery module having an improved assembling property, and a battery pack including the same.

BACKGROUND ART

(3) Secondary batteries, which are easily applicable to various product groups and have electrical characteristics such as high energy density, are universally applied not only for a portable device but also for an electric vehicle or a hybrid electric vehicle, an energy storage system or the like, which is driven by an electric driving source. Such secondary batteries are attracting attention as a new environment-friendly energy source for improving energy efficiency since they provide a primary advantage of remarkably reducing the use of fossil fuels and also does not generate by-products from the use of energy at all.

(4) Small-sized mobile devices use one or several battery cells for each device, whereas middle or large-sized devices such as vehicles require high power and large capacity. Therefore, a middle or large-sized battery module having a plurality of battery cells electrically connected to one another is used.

(5) The middle or large-sized battery module is preferably manufactured so as to have as small a size and weight as possible. For this reason, a prismatic battery, a pouch-shaped battery or the like, which can be stacked with high integration and has a small weight relative to capacity, is usually used as a battery cell of the middle or large-sized battery module. Meanwhile, in order to protect the battery cell stack from external impact, heat or vibration, the battery module may include a module frame in which a front surface and rear surface are opened to house the battery cell stack in an internal space.

(6) FIG. **1** is a perspective view illustrating a battery module having a module frame according to the related art. FIG. **2** is a view illustrating a cross-sectional view taken along the xz plane of FIG.

1.
(7) Referring to FIGS. **1** and **2**, the battery module may include a module frame **10** of which a front surface and a rear surface are opened so as to cover the battery cell stack **12** formed by stacking a plurality of battery cells **11**, and end plates **20** arranged to cover the front surface and the rear surface of the module frame **10**. The module frame **10** may include a U-shaped frame **10***a* and an upper plate **10***b* for covering an open upper part of the U-shaped frame **10***a*. The U-shaped frame **10***a* may include a bottom part **10***a***1** for covering the lower surface of the battery cell stack **12**, and two side surface parts **10***a***2** having a structure protruding upward from both sides of the bottom part **10***a***1**. The end plate **20** may include a front plate **20***a* for covering one side of the module frame **10**, and a rear plate **20***b* for covering the other side of the module frame **10**.
(8) In order to form such a battery module, in a state in which the battery cell stack **12** is mounted inside the module frame **10**, welding or the like can be performed in order to couple the U-shaped frame **10***a* and the upper plate **10***b* of the module frame **10**. At this time, assembly defects may occur in the assembly process in which the upper plate **10***b* is placed on the U-shaped frame **10***a*. In particular, when a welding part ("WP") is formed between the upper plate **10***b* and the side surface part of the U-shaped frame **10***a*, a guide for assembly alignment may be absent, which may cause defects. In particular, as shown in FIG. **2**, due to the thickness tolerance of the battery cell **11**, the side surface part **10***a***2** of the U-shaped frame **10***a* is widened and thus, there is a high possibility that assembly defects occur.
(9) Therefore, there is a need to develop a technique capable of solving these problems involved in the prior art.

DETAILED DESCRIPTION OF THE INVENTION

Technical Problem

(10) It is an object of the present disclosure to provide a battery module having an improved assembling property, and a battery pack including the same.
(11) However, the technical problem to be solved by embodiments of the present disclosure is not limited to the above-described problems, and can be variously expanded within the scope of the technical idea included in the present disclosure.

Technical Solution

(12) According to one embodiment of the present disclosure, there is provided a battery module comprising: a battery cell stack in which a plurality of battery cells are stacked, a module frame arranged so as to wrap the battery cell stack, a busbar frame arranged so as to cover the front and rear surfaces of the battery cell stack that is exposed from the module frame, and an end plate arranged so as to cover the busbar frame, wherein the module frame includes a lower frame for covering the lower part and both side surfaces of the battery cell stack, and an upper plate for covering the upper part of the battery cell stack, and wherein at least one assembly guide part is formed at an edge of the lower frame coupled to the upper plate.
(13) The lower frame may include a bottom part supporting the lower part of the battery cell stack, and two side surface parts extending upward from both ends of the bottom part, and the assembly guide part may be formed at an upper edge of the side surface part.
(14) The assembly guide part may include a protrusion-shaped support part that protrudes in in one direction.
(15) A groove part in which the support part of the assembly guide part is assembled may be formed in the upper plate.
(16) A width of the side surface part may be wider than a width of the support part.
(17) The groove part may have a structure in which one side edge of the edge of the upper plate is opened.
(18) The support part may be formed on one side of the edge of the side surface part in the horizontal direction.
(19) The support part may include a bending part.

(20) The bending part may be bent in a direction in which the support part protrudes and is connected to the side surface part.
(21) According to one embodiment of the present disclosure, there is provided a battery pack comprising the above-mentioned battery module.
Advantageous Effects
(22) According to embodiments of the present disclosure, a slot-type assembly guide structure is formed on the module frame, thereby capable of preventing misalignment when assembling the module frame. Through such improvement of the assembling property, it is possible to prevent welding defects from occurring when the module frame is coupled by welding.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
(1) FIG. **1** is a perspective view illustrating a battery module having a module frame according to the related art;
(2) FIG. **2** is a cross-sectional view taken along a plane x-z of FIG. **1**;
(3) FIG. **3** is an exploded perspective view illustrating a battery module according to an embodiment of the present disclosure;
(4) FIG. **4** is a perspective view illustrating a lower frame of the battery module of FIG. **3**;
(5) FIG. **5** is a perspective view illustrating an upper plate of the battery module of FIG. **3**;
(6) FIG. **6** is a partial perspective view illustrating an assembling part of a battery module according to an embodiment of the present disclosure;
(7) FIG. **7** is a partial perspective view illustrating an assembling part of a battery module according to another embodiment of the present disclosure; and
(8) FIG. **8** is a partial perspective view illustrating an assembling part of a battery module according to another embodiment of the present disclosure.
DETAILED DESCRIPTION OF THE EMBODIMENTS
(9) Hereinafter, various embodiments of the present disclosure will be described in detail with reference to the accompanying drawings so that those skilled in the art can easily implement them. The present disclosure may be modified in various different ways, and is not limited to the embodiments set forth herein.
(10) A description of parts not related to the description will be omitted herein for clarity, and like reference numerals designate like elements throughout the description.
(11) Further, in the drawings, the size and thickness of each element are arbitrarily illustrated for convenience of description, and the present disclosure is not necessarily limited to those illustrated in the drawings. In the drawings, the thickness of layers, regions, etc. are exaggerated for clarity. In the drawings, for convenience of description, the thicknesses of some layers and regions are exaggerated.
(12) In addition, it will be understood that when an element such as a layer, film, region, or plate is referred to as being “on” or “above” another element, it can be directly on the other element or intervening elements may also be present. In contrast, when an element is referred to as being “directly on” another element, it means that other intervening elements are not present. Further, the word “on” or “above” means disposed on or below a reference portion, and does not necessarily mean being disposed on the upper end of the reference portion toward the opposite direction of gravity.
(13) Further, throughout the description, when a portion is referred to as “including” a certain component, it means that the portion can further include other components, without excluding the other components, unless otherwise stated.
(14) Further, throughout the description, when referred to as “planar”, it means when a target

portion is viewed from the upper side, and when referred to as “cross-sectional”, it means when a target portion is viewed from the side of a cross section cut vertically.

(15) FIG. **3** is an exploded perspective view illustrating a battery module according to an embodiment of the present disclosure.

(16) Referring to FIG. **3**, the battery module according to an embodiment of the present disclosure includes a battery cell stack **100** in which a plurality of battery cells **110** are stacked, a module frame **200** arranged so as to wrap the battery cell stack **100**, a busbar frame **400** arranged so as to cover the front and rear surfaces of the battery cell stack **100**, and an end plate **600** arranged so as to cover the outside of the busbar frame **400** on the basis of the battery cell stack **100**.

(17) The battery cell **110** according to the embodiment of the present disclosure is a secondary battery and may be configured as a pouch-type secondary battery. Such a battery cell **110** may be composed of a plurality of cells, and the plurality of battery cells **110** may be stacked together so as to be electrically connected to each other, thereby forming the battery cell stack **100**. The plurality of battery cells **110** may include an electrode assembly, a cell case, and an electrode lead protruding from the electrode assembly, respectively.

(18) A busbar **411** and a connector **500** may be mounted on the busbar frame **400**. The connector **500** can sense voltage and temperature from busbars or thermistors mounted on the busbar frame **400** and transmit them to a battery management system (BMS). Among the busbar frames **400** formed on the front and rear surfaces of the battery cell stack **100**, a first connector **510** is formed in the busbar frame **400** located on the front surface of the battery cell stack **100**, and a second connector **520** may be formed on the busbar frame **400** located on the rear surface of the battery cell stack **100**.

(19) Conventionally, the connector is formed only in one busbar frame part among the two busbar frames formed on the front and rear surfaces of the battery cell stack **100**, and the busbar frame part where the connector has not been formed transmits voltage and temperature sensing information to the connector located on the opposite side of the battery cell stack through a flexible flat cable. At this time, since the flexible flat cable is located on the upper side of the battery cell stack, a step of assembling the flexible flat cable and a step of confirming whether there is a problem in connection through the flexible flat cable were separately required.

(20) According to an embodiment of the present disclosure, the first and second connectors **510** and **520** are separately formed on each side of the busbar frames **400** formed on the front and rear surfaces of the battery cell stack **100**, whereby the voltage and temperature sensed through the connector formed on each busbar frame **400** can be transmitted to the BMS in both directions without the need to separately assemble the flexible flat cable. Through this, the manufacturing cost of the battery module can be reduced and the battery module structure can be simplified. In addition, the process of assembling the flexible flat cable and the process of confirming poor connection can be eliminated, and the manufacturing process of the battery module can be simplified.

(21) The battery cell stack **100** is disposed in the module frame **200**. According to the embodiment of the present disclosure, the module frame **200** includes a lower frame **210** that covers the lower surface and both side surfaces of the battery cell stack **100**, and an upper plate **220** that covers the upper surface of the battery cell stack **100**.

(22) In a state in which the busbar frame **400** is mounted on the front and rear surfaces of the battery cell stack **100**, the battery cell stack **100** may be disposed on the lower frame **210**. Thereafter, the upper plate **220** may be assembled so as to cover the upper part of the battery cell stack **100**. At this time, the battery cell stack **100** can be stably arranged in the inside of the module frame **200** through the fixing of the upper plate **220** and the lower frame **210**.

(23) The lower frame **210** of the module frame **200** that houses the battery cell stack **100** may be a U-shaped frame. The U-shaped frame **210** may include a bottom part **210***a* and two side surface parts **210***b* extending upward from both ends of the bottom part **210***a*. The bottom part **210***a* may

cover the lower surface (the direction opposite to the z-axis) of the battery cell stack **100**, and the side surface part **210***b* may cover both side surfaces (x-axis direction and direction opposite to the same) of the battery cell stack **100**.

(24) The upper cover plate **220** may be formed in a single plate-shaped structure that wraps the lower surface wrapped by the U-shaped frame **210** and the remaining upper surface (z-axis direction) excluding both side surfaces. The upper cover plate **220** and the U-shaped frame **210** can be coupled by welding or the like in a state in which the corresponding edge portions are in contact with each other, thereby forming a structure that covers the battery cell stack **120** vertically and horizontally. The battery cell stack **120** can be physically protected through the upper cover plate **220** and the U-shaped frame **210**. For this purpose, the upper cover plate **220** and the U-shaped frame **210** may include a metal material having a predetermined strength.

(25) As described previously with reference to FIGS. **1** and **2**, in a state in which the battery cell stack **100** is mounted inside the module frame **200**, welding or the like can be performed in order to couple the U-shaped frame **210** and the upper plate **220** of the module frame **200**. At this time, in order to form a welded part, it is necessary to fix the U-shaped frame **210** and the upper plate **220** so that the coupling surfaces of the side surface part **210***b* and the upper plate **220** of the U-shaped frame **210** are located to correspond to each other. However, there is a limit to fixing the U-shaped frame **210** and the upper plate **220** so that they closely correspond to each other, which causes a problem that the welding is not smoothly performed.

(26) Further, a laser welding may be performed for welding, and internal parts including battery cells may be damaged due to the laser itself or weld spatters penetrated during the welding process. At this time, if an assembly defect occurs in the assembling process in which the upper plate **220** is placed on the U-shaped frame **210**, the welding line may also be misaligned, which results in the welding defects. In addition, much more welding spatter flows into the battery module where the battery cells are located, which may cause a bigger problem.

(27) In order to reduce these problems, the battery module according to the embodiment of the present disclosure includes a lower frame having a slot-type assembly guide structure, whereby the assembling property of the lower frame and the upper plate can be improved and the welding defects can be prevented accordingly. This will be described in detail with reference to FIGS. **4** to **6**.

(28) FIG. **4** is a perspective view illustrating a lower frame included in the battery module of FIG. **3**. FIG. **5** is a perspective view illustrating an upper plate included in the battery module of FIG. **3**. FIG. **6** is a partial perspective view illustrating the assembling part of the upper plate and the lower frame in the battery module according to an embodiment of the present disclosure.

(29) Referring to FIG. **4**, an assembly guide part **210**G may be formed at the upper edge of the side surface part **210***b* of the U-shaped frame **210** according to the embodiment of the present disclosure. At least one assembly guide part **210**G may be formed at an upper end edge of the side surface part **210***b* of the U-shaped frame **210**. The plurality of assembly guide parts **210**G may be formed so as to be separated from each other while having a predetermined interval.

(30) The assembly guide part **210**G according to the embodiment of the present disclosure may include a protrusion-shaped support part **210**P that protrudes in the z-axis direction.

(31) Referring to FIG. **5**, a groove part **220**S corresponding to the assembly guide part **210**G formed in the U-shaped frame **210** may be formed in the upper plate **220** according to the embodiment of the present disclosure. The groove part **220**S can have a structure that penetrates the upper plate **220** in the z-axis direction from an adjacent portion at the both edges of the upper plate **220** so that the assembly guide part **210**G of the U-shaped frame **210** can be assembled with the upper plate **220**. The groove part **220**S may be formed in a shape corresponding to the support part **210**P of the assembly guide part **210**G, and can have various shapes such as a rectangle and a circle.

(32) Referring to FIGS. **5** and **6**, the support part **210**P formed on the side surface part **210***b* of the

lower frame **210** can be inserted into the groove part **220**S formed on the upper plate **220**. The width of the support part **210**P defined along the x-axis direction may be narrower than the width of the side surface part **210***b* of the lower frame **210** defined along the x-axis direction, so that assembly is performed in a state where the side surface part and one side surface of the upper plate are aligned. The x-axis direction used herein may be the same as the direction in which the battery cells **110** of FIG. **3** are stacked, the y-axis direction may be perpendicular to the direction in which the battery cells **110** are stacked, and the z-axis direction may be perpendicular to the xy plane.

(33) According to the embodiment of the present disclosure, by fixing the positions in the x-axis direction and the y-axis direction, not only the assembling property but also the durability of the battery module can be improved.

(34) As shown in FIG. **3**, in the case of a large-area module in which the number of battery cells **110** stacked as in the battery cell stack **100** according to an embodiment of the present disclosure is larger than the number of battery cells **11** in the battery cell stack **12** shown in FIG. **2**, the horizontal direction length of the battery module is increased. The large area module has a structure in which the horizontal direction length of the battery module is increased, so that the load from the central part becomes large and the possibility of bending deformation becomes high. Here, the length in a horizontal direction may mean a length in a direction in which the battery cells are stacked. Due to the bending deformation, the coupling structure of the U-shaped frame **210** and the upper plate **220** may be misaligned depending on the usage conditions of the battery module, but according to the embodiment of the present disclosure, the coupling holding force of the U-shaped frame **210** and the upper plate **220** can be improved by strongly fixing the positions in the two directions of the x-axis direction and the y-axis direction.

(35) Referring back to FIG. **3**, the battery module according to the embodiment of the present disclosure may further include an end plate **600** arranged to cover the front and rear surfaces of the battery cell stack **100**. The battery cell stack **100** arranged inside can be physically protected via the module frame **200** described above. The end plate **600** may be located on the front surface (y-axis direction) and the rear surface (y-axis direction) of the battery cell stack **100**. The end plate **600** is formed so as to cover the battery cell stack **100**, and can physically protect the battery cell stack **100** and other electrical components from external impact.

(36) Meanwhile, although not specifically illustrated, the busbar frame **400** to which the busbar **411** is mounted, and an insulating cover for electrical insulation, etc. may be located between the battery cell stack **100** and the end plate **600**.

(37) FIG. **7** is a partial perspective view illustrating an assembling part of an upper plate and a lower frame in a battery module according to another embodiment of the present disclosure.

(38) Referring to FIG. **7**, the side surface part **210***b*′ of the lower frame may be partially machined to form the side surface part **210***b*″ having an L-shaped cross-section cut on the yz plane. The side surface part **210***b*′ is an assembly guide part, which may include a protrusion-shaped support part **210**P′ formed at an upper edge of the side surface part **210***b*′. In the upper plate **220**′ according to the embodiment of the present disclosure, a groove part **220**S′ is formed on one side in the y-axis direction, and the groove part **220**S′ may have a structure in which one side in the y-axis direction is opened. In other words, the groove part **220**S′ can be opened at one side edge of the upper plate **220**′.

(39) The support part **210**P′ according to the embodiment of the present disclosure may be formed on one side of the side surface part **210***b*′ in the y-axis direction. The support part **210**P′ may be assembled into the groove part **220**S′ of the upper plate **220**′ while moving the side surface part **210***b*′ in a direction opposite to the y-axis. At this time, the assembly may be performed in a state where the side surface part **210***b*′ and one side surface of the upper plate **220**′ are aligned with each other. In other words, the support part **210**P′ may be formed on one side of the edge in the horizontal direction of the side surface part **210***b*′. Here, the horizontal direction may be the same as the y-axis direction.

(40) FIG. **8** is a partial perspective view illustrating the assembling part of the upper plate and the lower frame in the battery module according to another embodiment of the present disclosure.
(41) The embodiment of FIG. **8** is almost the same as the embodiment of FIG. **7**, and only parts having differences will be described below. Except for the following differences, all the contents described in the embodiment of FIG. **7** can be applied to the embodiments of the present disclosure.
(42) Referring to FIG. **8**, the side surface part **210***b*′ of the lower frame according to the embodiment of the present disclosure may include a support part **210**P′ having a bending part **210**B through a bending work. The bending part **210**B may be bent in a direction in which the support part **210**P′ protrudes to be connected to the side surface part **210***b*′. The side surface part **210***b*′ is as an assembly guide part, which may include a protrusion-shaped side support part **210**P′ formed at the upper edge of the side part **210***b*′. In the upper plate **220**′ according to the embodiment of the present disclosure, a groove part **220**S′ is formed on one side in the y-axis direction, and the groove part **220**S′ may have a structure in which one side in the y-axis direction is opened.
(43) The support part **210**P′ according to the embodiment of the present disclosure may be formed on one side of the side part **210***b*′ in the y-axis direction, and the support part **220**P′ may be assembled into the groove part **220**S′ of the upper plate **220**′ while moving the side surface part **210***b*′ in the direction opposite to the y-axis. At this time, the assembly may be performed in a state that the side surface part **210***b*′ and one side of the upper plate **220**′ are aligned with each other.
(44) Meanwhile, one or more of the battery modules according to embodiments of the present disclosure can be packaged in a pack case to form a battery pack. The battery pack can be mounted together with various control and protection systems such as a battery management system (BMS) and a cooling system to form a battery pack.
(45) The above-mentioned battery module or the battery pack including the same can be applied to various devices. These devices can be applied to vehicle means such as an electric bike, an electric vehicle, and a hybrid electric vehicle, and may be applied to various devices capable of using a secondary battery, without being limited thereto.
(46) Although preferred embodiments of the present disclosure has been described above, the scope of the present disclosure is not limited thereto and modifications and improvements made by those skilled in the part by using the basic concept of the present disclosure, which are defined in the following claims, also belong to the scope of the present disclosure.
DESCRIPTION OF REFERENCE NUMERALS
(47) **200**: module frame **210**: lower frame **210**G: assembly guide part **210**P: support part **220**: upper plate **220**S: groove part

Claims

1. A battery pack comprising: a battery cell stack including a plurality of stacked battery cells, the battery cell stack including a lower surface and an upper surface on an opposite side and side surfaces extending therebetween, and a busbar frame arranged to cover at least one surface of the battery cell stack, wherein the battery cell stack comprises a lower frame to cover the lower surface and the side surfaces, and an entirely flat upper plate for covering the upper surface, and wherein at least one assembly guide part is formed at an edge of the lower frame, the at least one assembly guide part including a support part that protrudes from the lower frame, the support part being configured to be received in a groove part of the upper plate to couple the lower frame to the upper plate, the groove part being defined by an opening extending through the upper plate.
2. The battery pack of claim 1, wherein the lower frame comprises a bottom part to support the lower surface, and two side surface parts extending upward from both ends of the bottom part, the assembly guide part being formed at an upper edge of at least one of the side surface parts.
3. The battery pack of claim 2, wherein the support part protrudes from the upper edge.

4. The battery pack of claim 3, wherein a width of the side surface part is wider than a width of the support part.
5. The battery pack of claim 3, wherein the opening extends through an edge of the upper plate.
6. The battery pack of claim 5, wherein the support part comprises a bending part.
7. The battery pack of claim 6, wherein the bending part is bent in a direction along which the support part protrudes, the bending part being connected to the side surface part.
8. The battery pack of claim 1 further comprising a battery module.