

BATTERY AND BATTERY MODULE

CROSS-REFERENCE TO RELATED APPLICATION

【0001】 The present application claims the priority to Chinese Patent Application No. 202421690509.9, filed with the China National Intellectual Property Administration (CNIPA) on July 16, 2024. The entire disclosures of the above application are incorporated herein by reference.

TECHNICAL FIELD

【0002】 The present application relates to a field of battery technologies, particularly to a battery and a battery module.

BACKGROUND

【0003】 During a manufacturing process of the battery module, it is typically necessary to add a pressing strip structure to restrain the expansion force of the battery cell and reduce the shear force on the glue at the bottom portion of the battery cell. This improves a displacement of the battery module in the horizontal and vertical directions. When the pressing strip is directly connected to a top portion insulation sheet of the battery cell, the connection method between the pressing strip and the battery cell is as follows: pressing strip-structure glue-top portion insulation sheet-top portion insulation sheet glue-top cover.

SUMMARY

【0004】 However, film layers such as the top portion insulation sheet between the pressing strip and the battery cell are prone to bulging or detaching from the battery cell during the battery cell's expansion process. This affects the force exerted by the pressing strip on the battery cell, leading to the failure of the pressing strip to restrain the expansion force of the battery cell.

【0005】 In a first aspect, the embodiment of the present application provides a battery, comprising:

【0006】 a battery cell, comprising a top surface and a bottom surface opposite to each other, wherein at least one electrode column is disposed on the top surface; and

【0007】 an insulation sheet disposed on a side of the top surface away from the bottom surface, wherein a connection region is defined on the insulation sheet, the

connection region exposes the top surface, and a pressing strip is connected to the battery cell through the connection region.

【0008】 In a second aspect, the embodiment of the present application provides a battery module, comprising:

【0009】 a battery set comprising at least one sub-battery set, wherein the sub-battery set comprises a plurality of the batteries according the first aspect, and the plurality of the batteries are arranged along a second direction; and

【0010】 at least one pressing strip, wherein the pressing strip extends along the second direction and is connected to the sub-battery set;

【0011】 wherein the pressing strip is disposed on a side of the top surface away from the bottom surface and is connected to the battery cell through the connection region.

Beneficial effect

【0012】 The present application provides a battery and a battery module. An insulation sheet is disposed on a top surface of the battery. A connection region is defined on the insulation sheet. The connection region exposes a top surface of a battery cell. A pressing strip is connected to the top surface of the battery cell through the connection region. In the present application, because the connection region for avoiding the pressing strip is defined on the insulation sheet, the pressing strip is directly connected and fixed to the battery cell through the connection region. During expansion of the battery cell, the pressing strip always press-fits the top surface of the battery cell, thereby preventing the issue of separation or displacement of the pressing strip and the battery cell. Therefore, in the present application, pressing strip can more effectively restrain the expansion force of the battery cell and reduce a shear force applied to a glue of a bottom portion of the battery cell, thereby improving the displacement of the battery module along the horizontal direction and the vertical direction.

BRIEF DESCRIPTION OF THE DRAWINGS

【0013】 FIG. 1 is a schematic exploded structural view of a battery provided by an embodiment of the present application;

【0014】 FIG. 2 is a schematic structural view of the battery provided by the embodiment of the present application;

【0015】 FIG. 3 is a top view of one of the batteries provided by the

embodiment of the present application;

【0016】 FIG. 4 is a top view of one of the batteries provided by the embodiment of the present application;

【0017】 FIG. 5 is a top view of one of the batteries provided by the embodiment of the present application;

【0018】 FIG. 6 is a top view of one of the batteries provided by the embodiment of the present application;

【0019】 FIG. 7 is a top view of one of the batteries provided by the embodiment of the present application;

【0020】 FIG. 8 is a top view of one of the battery modules provided by the embodiment of the present application;

【0021】 FIG. 9 is a top view of one of the battery modules provided by the embodiment of the present application;

【0022】 FIG. 10 is a top view of one of the battery modules provided by the embodiment of the present application;

【0023】 FIG. 11 is a top view of one of the battery modules provided by the embodiment of the present application;

【0024】 FIG. 12 is a top view of one of the battery modules provided by the embodiment of the present application; and

【0025】 FIG. 13 is a top view of one of the battery modules provided by the embodiment of the present application.

【0026】 Indication of reference numerals: 10-battery set, 100-battery, 101-sub-battery set, 110-battery cell, 1101-top surface, 1102-bottom surface, 111-electrode column, 1111-first electrode column, 1112-second electrode column, 112-explosion-proof valve, 113-two dimensional code, 120-insulation sheet, 1200-sub-insulation sheet, 1201-first sub-insulation sheet, 1202-second sub-insulation sheet, 1203-third sub-insulation sheet, 121-connection region, 1211-first connection region, 1212-second connection region, 122-electrode column hole, 1221-first electrode column hole, 1222-second electrode column hole, 123-explosion-proof valve hole, 124-two dimensional code hole, 125-inspection hole, 130-outer protective film, 20-pressing strip, 200-battery module, 210-first pressing strip, 220-second pressing strip.

DETAILED DESCRIPTION

【0027】 With reference to FIG. 1 to FIG. 2, a battery 100 provided by the

present application is shown, and the battery 100 comprises a battery cell 110 and an insulation sheet 120. The battery cell 110 comprises a top surface 1101 and a bottom surface 1102 opposite to each other. At least one electrode column 111 is disposed on the top surface 1101. The insulation sheet 120 is disposed on a side of the top surface 1101 away from the bottom surface 1102. A connection region 121 is defined on the insulation sheet 120. The connection region 121 exposes the top surface 1101. A pressing strip 20 is connected to the battery cell 110 through the connection region 121.

【0028】 In a conventional battery module, the pressing strip 20 is usually disposed directly on the insulation sheet 120 without being directly connected to the battery cell 110. During expansion of the battery cell 110, volume variation of the battery cell 110 leads to deformation of the insulation sheet 120, for example, bulging. At this time, the insulation sheet 120 is easily separated from the battery cell 110, and the pressing strip 20 connected to the insulation sheet 120 surface fails to tightly press-fit the battery cell 110, thereby influencing a fixation function of the pressing strip 20 to the battery cell 110. After losing the force from the pressing strip 20, the battery cell 110, under the effect of the expansion force, would have a vertical upward displacement. Also, the battery cell 110, under the effect of a shear force of a glue of a bottom portion of the battery cell would have a horizontal direction displacement, thereby further influencing the performance of the battery module.

【0029】 The present application disposes the connection region 121 on the insulation sheet 120, and the connection region 121 exposes a top surface 1101 of the battery cell 110 such that the pressing strip 20 is directly connected and fixed to the battery cell 110 in the connection region 121. During expansion of the battery cell 110, the pressing strip 20 always press-fits the top surface 1101 of the battery cell 110 without causing issues of separation or displacement between the pressing strip 20 and the battery cell 110. In the battery module, a plurality of battery cells 110 are usually included, and the pressing strip 20 press-fits the top surface of the plurality of the battery cells 110. In the present application, the pressing strip 20 is always fixed to the battery cell 110 and fixes the plurality of the battery cells 110 together to form an integral whole, and also generates a pressure function to the battery cell 110 along a vertical direction. During the expansion of the battery cell 110, the battery cell 110 would generate expansion forces along the vertical direction and the horizontal direction. At this time, the pressing strip 20 would generate restraining forces to the battery cell 110

along the vertical direction and the horizontal direction. Along the vertical direction, squeezes among adjacent ones of the battery cells 110 would result in displacement of the battery cells along the vertical direction. The pressing strip 20 fixes the plurality of the battery cells 110 in an integral whole, thereby enabling to restrain the vertical upward displacement of the battery cell 110 resulting from the expansion of the battery cell. Along the horizontal direction, adjacent ones of the battery cells 110 are always connected and fixed to the pressing strip 20. Therefore, a horizontal direction displacement would not occur between the battery cells 110 due to the expansion forces of the battery cells and shear forces of the glues of the bottom portions of the battery cells. Thus, the battery 100 of the present application can more effectively restrain the expansion force of the battery cell 110 and reduce the shear force applied to the glue of the bottom portion of the battery cell 110, thereby mitigating the displacement of the battery module along the horizontal direction and the vertical direction.

【0030】 In some embodiments, with reference to FIG. 3 to FIG. 7, the insulation sheet 120 comprises two opposite ends along a first direction X. The connection region 121 can be located at at least one of the ends of the insulation sheet 120 along the first direction and/or between the two opposite ends of the insulation sheet 120 along the first direction. The insulation sheet 120 can comprise one or a plurality of the connection regions 121, and no restriction is here. The first direction is an extension direction of the insulation sheet 120. For example, the battery cell can be a square battery cell, the insulation sheet 120 can be rectangular, and the first direction can be an extension direction of a longer edge of the rectangle, but no restriction is here.

【0031】 The insulation sheet 120 comprising the two connection regions 121 is utilized as an example, with reference to FIG. 3 to FIG. 4, the two connection regions 121 can be located at two opposite ends of the insulation sheet 120 along the first direction, respectively. With reference to FIG. 5 to FIG. 6, both the two connection regions 121 can be located between the two opposite ends of the insulation sheet 120 along the first direction. With reference to FIG. 7, one of the two connection regions 121 can be located at an end of the insulation sheet 120 along the first direction, and the other of the two connection regions 121 can be located between the two opposite ends of the insulation sheet 120 along the first direction.

【0032】 In some embodiments, with reference to FIG. 3 to FIG. 4, when the connection region 121 is located at the at least one of the ends of the insulation sheet

120 along the first direction, the connection region 121 is a notch defined in an end portion of the insulation sheet 120.

【0033】 With reference to FIG. 3, when the connection region 121 is located at the end portion of the insulation sheet 120, a notch can be defined in the end portion, and the notch exposes the top surface 1101 such that the pressing strip 20 contacts and is connected to the battery cell 110 at a location of the notch. A shape of the notch can be U-shaped. Namely, the edge of the end portion of the insulation sheet 120 is at least partially dented along a direction toward a center of the insulation sheet 120. The notch can also be another shape, and no restriction is here.

【0034】 With reference to FIG. 2 and FIG. 4, when the connection region 121 is located at an end portion of the insulation sheet 120 along the first direction, the connection region 121 can also be formed from the dented entire edge of the end portion of the insulation sheet 120. Namely, a length of the insulation sheet 120 along the first direction is less than a length of the top surface 1101 along the first direction, and the two opposite ends of the insulation sheet 120 along the first direction expose shoulders of two opposite ends of the top surface 1101 along the first direction, respectively. As shown in FIG. 4, along the first direction, a distance a from an edge of the insulation sheet 120 to a central line C of the top surface 1101 is less than a distance b from an edge of the top surface 1101 of the same side to the central line C . A region AA from the edge of the insulation sheet 120 on the top surface 1101 to the edge of the top surface 1101 is defined as the connection region 121, the central line C is perpendicular to the first direction, and the top surface 1101 is symmetrical relative to the central line C .

【0035】 In some embodiments, with reference to FIG. 5, when the connection region 121 is located between the two opposite ends of the insulation sheet 120 along the first direction, the connection region 121 is a through hole defined in the insulation sheet 120, and the through hole penetrates the insulation sheet 120 along a direction perpendicular to the top surface 1101. The pressing strip 20 is connected to the top surface 1101 exposed by the through hole at a location of the through hole. The through hole can be a regular shape or an irregular shape. For example, the through hole can be rectangular, circular, etc., but no restriction is here.

【0036】 In some embodiments, with reference to FIG. 6, when the connection region 121 is located between the two opposite ends of the insulation sheet 120 along the first direction, the connection region 121 extends along a second direction

Y and divides the insulation sheet 120 into a plurality of sub-insulation sheets (1200) arranged at intervals along the first direction. The second direction is perpendicular to the first direction.

【0037】 In particular, with reference to FIG. 6, the insulation sheet 120 comprises two connection regions 121. Both the two connection regions 121 are located between the two opposite ends of the insulation sheet 120 along the first direction. The length of the insulation sheet 120 along the first direction can be the same the length of the top surface 1101 along the first direction. The two connection regions 121 divide the insulation sheet 120 into three sub-insulation sheets, i.e., a first sub-the insulation sheet 1201, a second sub-the insulation sheet 1202, and a third sub-the insulation sheet 1203 arranged at intervals along the first direction. A region located between the first sub-the insulation sheet 1201 and the second sub-the insulation sheet 1202 and exposing the top surface 1101 is a first connection region 1211, and a region located between the second sub-the insulation sheet 1202 and the third sub-the insulation sheet 1203 and exposing the top surface 1101 is a second connection region 1212. In the present embodiment, when the top surface 1101 is attached to the insulation sheet 120, the attachment can be implemented in three stages. Namely, the first sub-the insulation sheet 1201, the second sub-the insulation sheet 1202, and the third sub-the insulation sheet 1203 are sequentially attached to corresponding regions of the top surface 1101. Also, the first connection region 1211 is reserved between the first sub-the insulation sheet 1201 and the second sub-the insulation sheet 1202, and the second connection region 1212 is reserved between the second sub-the insulation sheet 1202 and the third sub-the insulation sheet 1203.

【0038】 In the present application, with reference to FIG. 1, one or a plurality of the electrode columns 111 can be disposed on the top surface 1101 of the battery 100, and no restriction is here. Also, an explosion-proof valve 112 and two dimensional codes 113 are disposed on the top surface 1101 of the battery 100. Disposing locations of the electrode column 111, the explosion-proof valve 112, and the two dimensional codes 113 on the top surface 1101 are not restricted, but the locations do not overlap the connection region 121. Accordingly, an electrode column hole 122, an explosion-proof valve hole 123, two dimensional code holes 124 are disposed on the insulation sheet 120.

【0039】 In some embodiments, with reference to FIG. 1, a first electrode

column 1111, a second electrode column 1112, and the explosion-proof valve 112 located between the first electrode column 1111 and the second electrode column 1112 are disposed on the top surface 1101. A first electrode column hole 1221 corresponding to the first electrode column 1111 and a second the electrode column hole 1222 corresponding to the second electrode column 1112, and the explosion-proof valve hole 123 corresponding to the explosion-proof valve 112 are disposed on the insulation sheet 120.

【0040】 With reference to FIG. 5, when the connection region 121 is located between the two opposite ends of the insulation sheet 120 along the first direction, the connection region 121 is located between the first electrode column hole 1221 and the explosion-proof valve hole 123 and/or between the second the electrode column hole 1222 and the explosion-proof valve hole 123.

【0041】 In the present embodiment, the explosion-proof valve 112 can be disposed at a center of the top surface 1101, thereby improving explosion-proof pressure relief uniformity. The first electrode column 1111 and the second electrode column 1112 can be disposed symmetrically relative to the explosion-proof valve 112. When the connection region 121 is located between the first electrode column hole 1221 or the second the electrode column hole 1222 and the explosion-proof valve hole 123, the pressing strip 20 is installed between the first electrode column 1111 and the second electrode column 1112. Because the expansion force at a center of the battery cell 110 is maximum, when The closer the pressing strip 20 is to the center location, the more effectively the pressing strip 20 restrains the battery cell expansion force.

【0042】 In some embodiments, with reference to FIG. 4, a length of the battery cell 110 along the first direction is L, a length of the connection region 121 along the first direction is M, and a range of M is $(L/30-5) \text{ mm} \leq M \leq (L/30+5) \text{ mm}$. The length M of the connection region 121 along the first direction corresponds to a width of the pressing strip 20 along the first direction. When the value of M is over small, the width of the pressing strip 20 is over narrow, thereby failing to restrain the expansion force of the battery cell 110. When the value of M is over large, the width of the pressing strip 20 is over large, an occupied space is large, and the cost and the weight are increased.

【0043】 In some embodiments, when the battery cell 110 has the length $L \geq 300 \text{ mm}$, the connection region 121 has the length $M > 10 \text{ mm}$; and when the battery

cell 110 has the length $L < 300\text{mm}$, the connection region 121 has the length $M < 10\text{mm}$.

【0044】 In some embodiments, with reference to FIG. 1, an inspection hole 125 is further defined in the insulation sheet 120, and the connection region 121 does not overlap the inspection hole 125. For example, the inspection hole 125 can be a hole for a temperature/pressure sensor (NTC) hole to provide a location for a thermistor or a probe to monitor the temperature of the battery cell 110 in real time, thereby guaranteeing the safety of the battery cell 110.

【0045】 The inspection hole 125 can be defined near the explosion-proof valve 112. For example, a distance between the inspection hole 125 and the explosion-proof valve hole 123 can be 2 mm to 4 mm. The over short distance between the inspection hole 125 and the explosion-proof valve hole 123 probably makes a connection portion between the inspection hole 125 and the explosion-proof valve hole 123 on the insulation sheet 120 easily pulled and broken. The over long distance between the inspection hole 125 and the explosion-proof valve hole 123 would increase a wiring length of the NTC and lower a space utilization.

【0046】 In some embodiments, with reference to FIG. 1, the battery 100 further comprises an outer protective film 130. The outer protective film 130 can be a polymer film, for example, a blue film. In particular, the battery cell 110 further comprises a side surface located between the top surface 1101 and the bottom surface 1102, and the outer protective film 130 covers the bottom surface 1102 and the side surface to protect the battery cell 110.

【0047】 With reference to FIG. 8 to FIG. 13, the present application also provides a battery module 200, the battery module 200 comprises a battery set 10 and at least one pressing strip 20. The battery set 10 comprises at least one sub-battery set 101. The sub-battery set 101 comprises a plurality of the above batteries 100, and the plurality of the batteries 100 are arranged along the second direction. The plurality of the batteries 100 can be two or more batteries 100. The pressing strip 20 extends along the second direction and is connected to the sub-battery set 101. The pressing strip 20 is disposed on a side of the top surface 1101 away from the bottom surface 1102 and is connected to the battery cell 110 through the connection region 121.

【0048】 In the present application, structures of the plurality of the batteries 100 in the sub-battery set 101 are the same such that the connection regions 121 on

the plurality of the batteries 100 can be arranged and extend along the same direction, thereby facilitating the pressing strip 20 to be aligned with and connected to the connection region 121 of each of the batteries 100 in the sub-battery set 101. Bottom portions of the plurality of the batteries 100 in the sub-battery set 101 are fixed on a fixing element by a glue to fix the plurality of the batteries 100 together.

【0049】 In the sub-battery set 101, the plurality of the batteries 100 are arranged along the second direction. Namely, the connection regions 121 on the plurality of the batteries 100 are arranged along the second direction. The pressing strip 20 extends along the second direction the same as the arranging direction of the connection regions 121. The pressing strip 20 covers the connection regions 121 arranged along the second direction, and is connected to a corresponding one of the battery cells 110 through the connection region 121 on each of the batteries 100, thereby implementing the fixation and connection of the pressing strip 20 with each of the battery cells 110 in the sub-battery set 101. The plurality of the batteries 100 in the sub-battery set 101 are connected as an integral whole through the pressing strip 20. Because the location of the battery cell 110 and the location of the pressing strip 20 are unchanged relative to each other, during the expansion of the battery cell 110, the pressing strip 20 can restrain the expansion force of the battery cell 110 and reduce the shear force applied to the glue of the bottom portion of the battery cell 110, thereby further mitigating displacement of the battery module 200 along the horizontal direction and the vertical direction.

【0050】 The pressing strip 20 and the battery cell 110 can be connected by bonding, for example, the pressing strip 20 and the battery cell 110 are connected by a structural glue, but no restriction is here.

【0051】 In some embodiments, with reference to FIG. 8 to FIG. 10, the pressing strip 20 is located at at least one end of the sub-battery set 101 along the first direction and/or between two opposite ends of the sub-battery set 101 along the first direction.

【0052】 In particular, one sub-battery set 101 corresponding to two pressing strips 20 is utilized as an example, the two pressing strips 20 are parallel and extend along the second direction. Each battery 100 of a corresponding sub-battery set 101 comprises the two connection regions 121. With reference to FIG. 8, the two pressing strips 20 can be located at the two opposite ends of the sub-battery set 101 along the

first direction. At this time, the two connection regions 121 of the battery 100 are located at the two opposite ends of the insulation sheet 120 along the first direction. With reference to FIG. 9, both the two pressing strips 20 can be located between the two opposite ends of the sub-battery set 101 along the first direction. At this time, both the two connection regions 121 of the battery 100 are located between the two opposite ends of the insulation sheet 120 along the first direction. With reference to FIG. 10, one of the two pressing strips 20 can be located at an end of the sub-battery set 101 along the first direction, the other of the two pressing strips 20 can be located between the two opposite ends of the sub-battery set 101 along the first direction. At this time, one of the two connection regions 121 of the battery 100 is located at an end of the insulation sheet 120 along the first direction, and the other of the two connection regions 121 of the battery 100 is located between the two opposite ends of the insulation sheet 120 along the first direction. A location of the connection region 121 corresponds to a location of the insulation sheet 120.

【0053】 In some embodiments, with reference to FIG. 9, when the pressing strip 20 is located between the two opposite ends of the sub-battery set 101 along the first direction, the pressing strip 20 is located between the first electrode column 1111 and the explosion-proof valve 112 and/or between the second electrode column 1112 and the explosion-proof valve 112.

【0054】 In some embodiments, with reference to FIG. 11 to FIG. 13, when the battery set 10 comprises a plurality of the sub-battery sets 101, the plurality of the sub-battery sets 101 are arranged along the first direction. The battery module 200 comprises first pressing strips 210 and a second pressing strip 220. The first pressing strips 210 are located between the two opposite ends of the sub-battery set 101 along the first direction or located at at least one end of the battery set 10 along the first direction. The second pressing strip 20 is located between adjacent two of the sub-battery sets 101 and is connected to adjacent two of the sub-battery sets 101.

【0055】 With reference to FIG. 11 to FIG. 12, when the connection region 121 of the battery 100 is located at an end portion of the insulation sheet 120 along the first direction and the connection regions 121 adjacent two of the sub-battery sets 101 are adjacent to each other, adjacent two of the sub-battery sets 101 can share one second pressing strip 220, and the second pressing strip 220 is simultaneously connected to adjacent two of the sub-battery sets 101. At this time, the second pressing strip 220 can

simultaneously restrain the expansion forces of the battery cells of adjacent two of the sub-battery sets 101.

【0056】 In some embodiments, a length of the second pressing strip 220 along the first direction is twice a length of the first pressing strip 210 along the first direction, thereby simultaneously fulfilling the restraining effect to the expansion forces of adjacent two of the sub-battery sets 101.

【0057】 In particular, with reference to FIG. 11, the battery module 200 comprises the first pressing strips 210 and the second pressing strip 220. The first pressing strips 210 are located at two ends of the battery set 10 along the first direction, respectively. The second pressing strip 20 is located between adjacent two of the sub-battery sets 101. Namely, adjacent two of the sub-battery sets 101 share one second pressing strip 220. In the present embodiment, spaces of the shoulders of the two ends of the battery cell 110 are fully utilized. Also, a thickened second pressing strip 220 disposed between adjacent two of the sub-battery sets 101 can simultaneously control expansion degrees of the battery cell on left and right sides, and an appearance is more beautiful.

【0058】 With reference to FIG. 12, the battery module 200 comprises the first pressing strips 210 and the second pressing strip 220. The first pressing strips 210 are located between the two opposite ends of the sub-battery set 101 along the first direction. for example, between the electrode column 111 and the explosion-proof valve 112. The second pressing strip 20 is located between adjacent two of the sub-battery sets 101. Namely, adjacent two of the sub-battery sets 101 share one second pressing strip 220. In the present embodiment, the first pressing strip 210 is located at a location near a center of the battery 100, thereby more effectively restraining expansion force. Also, a thickened second pressing strip 220 disposed between adjacent two of the sub-battery sets 101 can simultaneously control expansion degrees on left and right sides.

【0059】 With reference to FIG. 13, the battery module 200 can also only comprise a plurality of the first pressing strips 210 without comprising the second pressing strip 220. The plurality of the first pressing strip 210 are located between the two opposite ends of the sub-battery set 101 along the first direction. In the present embodiment, the first pressing strips 210 are disposed near the center of the battery 100, and therefore can more effectively restrain expansion force. However, compared to the embodiment of FIG. 12, a space utilization is not high, and adjacent sub-battery set

101s cannot be restrained simultaneously.

【0060】 In the present application, a material of the pressing strip can be metal, for example, aluminum or steel, but no restriction is here.

CLAIMS

1. A battery, comprising:

a battery cell (110) comprising a top surface (1101) and a bottom surface (1102) opposite to each other, wherein at least one electrode column (111) is disposed on the top surface (1101); and

an insulation sheet (120) disposed on a side of the top surface (1101) away from the bottom surface (1102), wherein a connection region (121) is defined on the insulation sheet (120), the connection region (121) exposes the top surface (1101), and a pressing strip (20) is connected to the battery cell (110) through the connection region (121).

2. The battery according to claim 1, wherein the insulation sheet (120) comprises two opposite ends along a first direction, the connection region (121) is located at at least one of the ends of the insulation sheet (120) along the first direction and/or between the two opposite ends of the insulation sheet (120) along the first direction, and the first direction is an extension direction of the insulation sheet (120).

3. The battery according to claim 2, wherein when the connection region (121) is located at the at least one end of the insulation sheet (120) along the first direction, the connection region (121) is disposed in a notch of an end portion of the insulation sheet (120).

4. The battery according to claim 2, wherein when the connection region (121) is located between the two opposite ends of the insulation sheet (120) along the first direction, the connection region (121) is a through hole defined in the insulation sheet (120), and the through hole penetrates the insulation sheet (120) along a direction perpendicular to the top surface (1101).

5. The battery according to claim 2, wherein when the connection region (121) is located between the two opposite ends of the insulation sheet (120) along the first direction, the connection region (121) extends along a second direction and divides the insulation sheet (120) into a plurality of sub-insulation sheets (1200) arranged at intervals along the first direction, and the second direction is perpendicular to the first direction.

6. The battery according to claim 2, wherein a first electrode column (1111), a second electrode column (1112), and an explosion-proof valve (112) located between the first electrode column (1111) and the second electrode column (1112) are disposed on the top surface (1101), a first electrode column hole (1221) corresponding to the

first electrode column (1111), a second electrode column hole (1222) corresponding to the second electrode column (1112), and an explosion-proof valve hole (123) corresponding to the explosion-proof valve (112) are disposed on the insulation sheet (120);

when the connection region (121) is located between the two opposite ends of the insulation sheet (120) along the first direction, the connection region (121) is located between the first electrode column hole (1221) and the explosion-proof valve hole (123) and/or between the second electrode column hole (1222) and the explosion-proof valve hole (123).

7. The battery according to any one of claims 2 to 6, wherein a length of the battery cell (110) along the first direction is L, and a length of the connection region (121) along the first direction is M, $(L/30-5) \text{ mm} \leq M \leq (L/30+5) \text{ mm}$.

8. The battery according to any one of claims 1 to 6, wherein an inspection hole (125) is defined in the insulation sheet (120), and the connection region (121) does not overlap the inspection hole (125).

9. A battery module, comprising:

a battery set (10) comprising at least one sub-battery set (101), wherein the sub-battery set (101) comprises a plurality of the batteries (100) according to any one of claims 1 to 8, and the plurality of the batteries (100) are arranged along a second direction; and

at least one pressing strip (20), wherein the pressing strip (20) extends along the second direction and is connected to the sub-battery set (101);

wherein the pressing strip (20) is disposed on a side of the top surface (1101) away from the bottom surface (1102) and is connected to the battery cell (110) through the connection region (121).

10. The battery module according to claim 9, wherein the sub-battery set (101) comprises two opposite ends along a first direction, the pressing strip (20) is located at at least one of the ends of the sub-battery set (101) along the first direction and/or between the two opposite ends of the sub-battery set (101) along the first direction, and the first direction is perpendicular to the second direction.

11. The battery module according to claim 10, wherein the battery set (10) comprises a plurality of the sub-battery sets (101), and the plurality of the sub-battery sets (101) are arranged along the first direction; and

the battery module (200) comprises a first pressing strip (210) and a second pressing strip (220), the first pressing strip (210) is located between the two opposite ends of the sub-battery set (101) along the first direction or at at least one end of the battery set (10) along the first direction, and the second pressing strip (220) is located between adjacent two of the sub-battery sets (101) and is connected to the adjacent two of the sub-battery sets (101).

12. The battery module according to claim 11, wherein a length of the second pressing strip (220) along the first direction is twice a length of the first pressing strip (210) along the first direction.

13. The battery module according to any one of claims 9 to 12, wherein the pressing strip (20) is connected to the battery cell (110) by bonding.