CLAIMS

What is claimed is:

1. An evaporator (10), comprising a heat exchange body (1), wherein the heat exchange body (1) comprises a dehumidification area (A) and an anti-frost cooling area (B) sequentially arranged along a first direction, the dehumidification area (A) is located at an air inflow side in the first direction;

the heat exchange body (1) comprises a heat exchange channel for refrigerant to flow, the heat exchange channel comprises a plurality of first channel sections and a plurality of second channel sections, the plurality of first channel sections are arranged at intervals along the first direction, and extend along a second direction perpendicular to the first direction, same side ends of adjacent first channel sections in the heat exchange channel are in communication with each other through the second channel sections; and

a number density of the first channel sections in the anti-frost cooling area (B) is less than a number density of the first channel sections in the dehumidification area (A);

wherein the heat exchange body (1) further comprises an enhanced cooling area (C) located downstream of the anti-frost cooling area (B) in the first direction; and

a number density of the first channel sections in the anti-frost cooling area (B) is less than a number density of the first channel sections in the enhanced cooling area (C).

2. The evaporator (10) of claim 1, wherein a distance in the first direction between adjacent first channel sections in the anti-frost cooling area (B) is greater than a distance in the first direction between adjacent first channel sections in the dehumidification area (A).

3. The evaporator (10) of any one of claims 1 to 2, wherein

a distance in the first direction between adjacent first channel sections in the anti-frost cooling area (B) is greater than a distance in the first direction between adjacent first channel sections in the enhanced cooling area (C).

4. The evaporator (10) of claim 1 or 3, wherein for the same heat exchange channel, the number of the first channel sections in the anti-frost cooling area (B) is greater than the number of the first channel sections in the dehumidification area (A); and/or the number of the first channel

sections in the dehumidification area (A) is greater than the number of the first channel sections in the enhanced cooling area (C).

5. The evaporator (10) of claim 1 or 3, wherein for the same heat exchange channel,

the number of the first channel sections in the dehumidification area (A) is the number of the first channel sections without frost;

the number of the first channel sections in the anti-frost cooling area (B) is configured such that the dehumidification area (A) and the anti-frost cooling area (B) together remove a predetermined percentage of moisture in an airflow and to achieve a predetermined heat exchange amount; and/or

the number of the first channel sections in the enhanced cooling area (C) is configured such that an overall heat exchange amount of the heat exchange body (1) meets a requirement.

6. The evaporator (10) of any one of claims 1 to 5, wherein the heat exchange body (1) comprises:

a base (1’); and

a heat exchange tube (2) mounted on the base (1’),

wherein the heat exchange channel is defined inside the heat exchange tube (2), the heat exchange tube (2) comprises a plurality of first tube sections (21) and a plurality of second tube sections (22), the first channel sections are defined inside the first tube sections (21), and the second channel sections are defined inside the second tube sections (22).

7. The evaporator (10) of any one of claims 1 to 6, wherein the heat exchange channel comprises a plurality of the heat exchange channels arranged along a third direction, the plurality of the heat exchange channels each comprise a first end and a second end arranged along the first direction, the first end is configured for inflow of the refrigerant, the second end is configured for outflow of the refrigerant, and the third direction is perpendicular to the first direction and the second direction; and

the plurality of the heat exchange channels at least comprise a pair of adjacent and crossed heat exchange channels, at the same side ends of the first channel sections, the second channel sections of the two crossed heat exchange channels are crossed with each other.

8. The evaporator (10) of claim 7, wherein at least one side of the heat exchange body (1) along the third direction is provided with the two crossed heat exchange channels.

9. The evaporator (10) of any one of claims 1 to 8, wherein an upwind surface (S) of the heat exchange body (1) comprises a surface of the dehumidification area (A) perpendicular to a third direction and facing inflow of air, and a surface of the dehumidification area (A) perpendicular to the first direction, wherein the third direction is perpendicular to the first direction and the second direction.

10. The evaporator (10) of any one of claims 1 to 9, wherein a surface of the heat exchange body (1) is coated with a hydrophobic coating.

11. The evaporator (10) of any one of claims 1 to 10, further comprising:

a liquid supply tube (4) and an gas outlet tube (5) respectively in communication with an inlet (23) and an outlet (24) at two ends of the heat exchange channel, the liquid supply tube (4) being provided with a throttling element (8); and

a first temperature detecting member (3) configured to detect a temperature at the dehumidification area (A) of the heat exchange body (1),

wherein an opening degree of the throttling element (8) is configured to increase on a condition that a detected value of the first temperature detecting member (3) exceeds a predetermined temperature value, and to decrease on a condition that the detected value of the first temperature detecting member (3) does not exceed the predetermined temperature value.

12. The evaporator (10) of claim 11, further comprising:

a second temperature detecting member (6) configured to detect a temperature of the liquid supply tube (4); and

a third temperature detecting member (7) configured to detect a temperature of the gas outlet tube (5),

wherein the opening degree of the throttling element (8) is configured to be determined according to a difference between detected values of the third temperature detecting member (7) and the second temperature detecting member (6), and the opening degree of the throttling element (8) is positively correlated with the difference between the detected values.

13. The evaporator (10) of claim 6, wherein the heat exchange tube (2) has a diameter in a range of 6 mm to 13 mm.

14. A refrigeration display cabinet comprising the evaporator (10) of any one of claims 1 to 13.

15. The refrigeration display cabinet of claim 14, further comprising:

a cabinet body (20) in which a first air pathway (30) and a second air pathway (40) are defined, the first air pathway (30) extending along a front-and-rear direction of the cabinet body (20) and being provided at a lower portion of the cabinet body (20), and the second air pathway (40) extending along an up-and-down direction of the cabinet body (20) and being provided at a rear portion of the cabinet body (20), and a lower portion of the second air pathway (40) is in communication with a rear portion of the first air pathway (30); and

a fan (70) disposed in the first air pathway (30) and configured to deliver cold air to the first air pathway (30), the cold air sequentially passing through the first air pathway (30) and the second air pathway (40) and forming a cold air curtain in a front surface of the cabinet body (20),

wherein the evaporator (10) is disposed in a lower region of the second air pathway (40), and the first direction coincides with the up-and-down direction.

16. The refrigeration display cabinet of claim 15, further comprising:

a baffle plate (80) disposed between the first air pathway (30) and the second air pathway (40),

wherein the dehumidification area (A) is located below the baffle plate (80), the anti-frost cooling area (B) and the enhanced cooling area (C) are located above the baffle plate (80), and an upwind surface (S) of the heat exchange body (1) comprises a surface of the dehumidification area (A) directly facing inflow of air and a bottom surface of the dehumidification area (A).

17. A control method based on the evaporator (10) of any one of claims 1 to 13, comprising:

detecting, by a first temperature detecting member (3), a temperature at the dehumidification area (A) of the heat exchange body (1); and

determining whether a detected value of the first temperature detecting member (3) exceeds a predetermined temperature value, increasing an opening degree of a throttling element (8) if the detected value exceeds the predetermined temperature value, and decreasing the opening degree of the throttling element (8) if the detected value does not exceed the predetermined temperature value, wherein the throttling element (8) is provided on a liquid supply tube (4) of the evaporator (10), and the liquid supply tube (4) is in communication with an inlet (23) of the heat exchange channel.

18. The control method of claim 17, wherein when there is a need to adjust the opening degree of the throttling element (8), the control method further comprises:

detecting, by a second temperature detecting member (6), a temperature of the liquid supply tube (4);

detecting, by a third temperature detecting member (7), a temperature of an gas outlet tube (5), the as outlet tube (5) is in communication with an outlet (24) of the heat exchange channel; and

determining the opening degree of the throttling element (8) according to a difference between detected values of the third temperature detecting member (7) and the second temperature detecting member (6), and the opening degree of the throttling element (8) is positively correlated with the difference between the detected values.