Claims

1. A method for preparing a vacuum glass, comprising the following steps:

i) enclosing a cavity with a glass body and a sealant, and disposing a getter in said cavity;

ii) heating a product of step i) in a vacuum environment, whereby creating a vacuum in said cavity, welding said sealant and said glass body together, and activating said getter;

iii) cooling a product of step ii), and then obtaining a vacuum glass;

wherein, in step ii), temperature increasing speed is reduced or temperature increase is stopped once bubbles start to form in the sealant.

2. The method according to claim 1, wherein step iii) comprises reducing a degree of vacuum and a temperature in a furnace by reducing the pressure in the furnace to atmospheric pressure when the sealant is still in a semi-solid state, subsequently lowering the temperature in the furnace to a solidification temperature of the sealant, and then opening the furnace to obtain the product.

3. The method according to claim 1, wherein step iii) comprises reducing a degree of vacuum and a temperature in a furnace, by reducing the pressure in the furnace to the atmospheric pressure within 5 to 10 minutes, lowering the temperature of the furnace to 50 °C or less within 10 to 12 hours, and opening the furnace to obtain the vacuum glass.

4. The method according to claim 1, wherein step ii) comprises reducing temperature increasing speed or stopping temperature increase in an initial bubble-forming stage.

5. The method according to claim 1, characterized in one or more of the following:

wherein, in step i), said getter is passivated getter;

wherein, in step i), said surface of said getter is free of an enclosure, and said enclosure is made of a hermetic material;

wherein, step i) further comprises disposing a support for supporting said glass body in said cavity;

wherein, step i) further comprises shaping the sealant into a desired shape in a mold;

wherein, in step i), the sealant is sealing glass;

wherein, in step ii), the heating is performed at a temperature of 300-600 °C;

wherein, in step ii), the heating is performed at a temperature of 400-500 °C;

wherein, in step ii), the heating is performed at a temperature greater than or equal to the sealing temperature of the sealant;

wherein, in step ii), the heating is performed at a temperature greater than or equal to the activation temperature of the getter;

wherein, in step ii), the heating is performed for a period longer than or equal to the activation time of the getter;

wherein, in step ii), the vacuum environment has an absolute pressure value less than or equal to 1×10-1Pa;

wherein, in step ii), the vacuum environment has an absolute pressure value less than or equal to 1×10-2Pa;

wherein, in step ii), the vacuum environment has an absolute pressure value less than or equal to 1×10-3Pa;

wherein, in step ii), the vacuum environment has an absolute pressure value less than or equal to 1×10-4Pa;

wherein, in step ii), heating is stopped at an initial bubble-forming stage of the sealant.

6. The method according to claim 1, wherein the vacuum glass comprising:

the glass body (1), the cavity (5) enclosed by said glass body (1) and the sealant (4) together, and the getter (3) disposed in said cavity (5);

said cavity (5) is hermetic therein;

the getter (3) is a non-evaporable getter, and said vacuum glass is free of an enclosure for enclosing the getter (3), and said enclosure is made of a hermetic material;

in a direction passing through said cavity (5), said vacuum glass has a thermal conductivity value K less than or equal to 4 $W/(m^2 \cdot K)$.

7. The method according to claim 6, characterized in one or more of the following,

wherein, said vacuum glass is free of a sealed evacuation port;

wherein, said glass body (1) is free of a sealed evacuation port thereon;

wherein, said sealant (4) is free of a sealed evacuation port thereon;

wherein, said vacuum glass is free of a sealing device for sealing the evacuation

port;

wherein, said vacuum glass comprises at least two glass bodies (1);

wherein, said vacuum glass comprises at least three glass bodies (1); and

wherein, adjacent glass bodies (1) are bonded by the sealant (4).

8. The method according to claim 6, wherein said glass body (1) comprises a plate-like glass body;

wherein, said glass body (1) comprises at least two plate-like glass bodies;

wherein, said plate-like glass bodies face each other;

wherein, said plate-like glass bodies are parallel to each other.

9. The method according to claim 6, characterized in one or more of the following,

wherein, said glass body (1) comprises a glass tube;

wherein, said glass body (1) comprises a glass plate;

wherein, said glass plate is a planar glass plate or a curved glass plate.

10. The method according to claim 6, characterized in one or more of the following,

wherein, a plated film or a paste film is provided on at least one glass body (1);

wherein, said glass body (1) has a flat surface;

wherein, said glass body (1) is grooveless;

wherein, said glass body (1) is formed of silicate glass;

wherein, said glass body (1) has a softening point higher than 550 °C;

wherein, said glass body (1) has a softening point higher than 650 °C;

wherein, said glass body (1) has a softening point higher than 750 °C;

wherein, said cavity (5) is a plate-like cavity;

wherein, said vacuum glass comprises at least one cavity (5);

wherein, said vacuum glass comprises at least two cavities (5); and

wherein, the sealant (4) and the glass body (1) are welded together.

11. The method according to claim 6, wherein said sealant (4) comprises sealing glass; characterized in one or more of the following,

wherein, the sealing glass comprises a glass selected from PbO-ZnO-B_2O_3

system, Bi_2O_3-B_2O_3-SiO_2 system, Bi_2O_3-B_2O_3-ZnO system, Na_2O-Al_2O_3-B_2O_3 system, SnO-ZnO-P_2O_5 system, V_2O_5-P_2O_5-Sb_2O_3 system, ZnO-B_2O_3-SiO_2 system and ZnO-B_2O_3-BaO system;

wherein, the sealing glass has a sealing temperature less than 500 °C;

wherein, the sealing glass has a sealing temperature of 300-450 °C; and

wherein, the sealing glass has a sealing temperature of 400-450 °C.

12. The method according to claim 6, characterized in one or more of the following,

wherein, said getter (3) is an activated getter;

wherein, said getter (3) is capable of absorbing one or more gases selected from O_2, N_2, CO_2, CO and H_2;

wherein, said getter (3) comprises an elementary substance with gettering ability, an alloy with gettering ability, a compound with gettering ability or a mixture with gettering ability;

wherein, said getter (3) contains zirconium element or titanium element;

wherein, said getter (3) contains one or more transition metal elements;

wherein, said getter (3) contains one or more rare earth metal elements;

wherein, said getter (3) is a Zr-Al type getter or a Zr-V-Fe type getter;

wherein, said getter (3) is in said cavity (5) in a density of 0.1g/cm^3 or more;

wherein, said getter (3) is in said cavity (5) in a density of 0.5g/cm^3 or more;

wherein, said getter (3) is in said cavity (5) in a density of 1g/cm^3 or more;

wherein, said getter (3) has an activation temperature less than or equal to the sealing temperature of the sealant (4);

wherein, said getter (3) is activated at 300-450 °C;

wherein, said getter (3) is activated by vacuum thermal treatment at 300 °C or more for 1 hour or more, or

said getter (3) is activated by heat treatment in vacuum at 350 °C or more for more than 0.5 hours, or

said getter (3) is activated by heat treatment in vacuum at 400 °C or more for 10 minutes or more.

13. The method according to claim 6, wherein said vacuum glass further comprises a support (2) for supporting said glass body (1) so as to maintain the shape

of the cavity (5); characterized in one or more of the following,

wherein, said support (2) is disposed in said cavity (5);

wherein, said support (2) is made of a metallic material or a non-metallic material;

wherein, said support (2) is made of a transparent inorganic substance;

wherein, said support (2) is made of glass;

wherein, said support (2) is a glass sheet;

wherein, said support (2) is a circular glass sheet, an elliptical glass sheet or a polygonal glass sheet;

wherein, said getter is disposed at a position close to an inner side of said sealant;

wherein said support is an elastic gasket;

wherein said elastic gasket is made of a metallic material.

14. A vacuum glass prepared by the method according to any one of claims 1-13.

15. A door, a window, an instrument, a meter or a solar collector, a greenhouse or a solar cell, comprising the vacuum glass according to claim 14;

wherein an outer wall of said greenhouse comprises the vacuum glass;

wherein said vacuum glass covers a photovoltaic conversion component of the solar cell.