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(54) **HEATING BODY, ATOMIZER AND ELECTRONIC ATOMIZATION DEVICE**

(57) Disclosed are a heating body, an atomizer and an electronic atomization device. aerosol-generation substanceThe heating body comprises a compact base body, which has a liquid suction surface and an atomization surface arranged opposite each other and is provided with a plurality of micropores that penetrate the liquid suction surface and the atomization surface. The atomization surface is of the surface-treated wetting structure that is in communication with the micropores in a liquid guide manner, which increases the wetting area of the atomization surface, thereby improving the atomization efficiency.

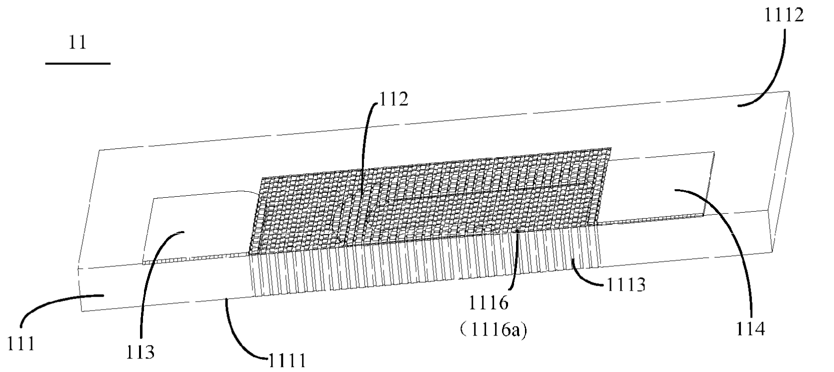

FIG. 3

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to the field of atomizing technologies, and in particular, to a heating body, an atomizer, and an electronic atomizing device.

BACKGROUND

[0002] An electronic atomizing device is formed by components such as a heating body, a battery, and a control circuit, etc. The heating body is a core component of the electronic atomizing device, and characteristics thereof decide an atomizing effect and use experience of the electronic atomizing device.

[0003] As technologies advance, requirements of a user on the atomizing effect of the electronic atomizing device become increasingly high. To meet the requirements of the user, a porous heating body made of a dense substrate such as glass is provided. However, the heat conduction efficiency of a dense substrate defining through holes is relatively poor when compared with a porous substrate defining disordered through holes (such as porous ceramic), which affects the atomizing efficiency.

SUMMARY

[0004] The present disclosure provides a heating body with a dense substrate, an atomizer and an electronic atomizing device both including the heating body to improve the atomizing efficiency.

[0005] To resolve the foregoing technical problem, a first technical solution provided in the present disclosure is to provide a heating body applied to an electronic atomizing device and configured to heat and atomize an aerosol-generation substance. The heating body includes a dense substrate, the dense substrate includes a liquid absorbing surface and an atomizing surface arranged opposite to each other; a plurality of micropores are defined on the dense substrate, and the plurality of micropores extend through from the liquid absorbing surface to the atomizing surface; and the atomizing surface is a wetting structure on which surface treatment is performed, and the wetting structure is fluidly coupled to the plurality of micropores.

[0006] In some embodiments, the atomizing surface includes a first concave-convex structure to form the wetting structure; and the first concave-convex structure includes a plurality of first grooves, and the plurality of first grooves are fluidly coupled to the plurality of micropores.

[0007] In some embodiments, the plurality of first grooves are defined parallel to each other, and the length direction of the plurality of first grooves is parallel to a first direction; and a first protruding bar is arranged between two adjacent first grooves; or the plurality of first grooves are defined parallel to each other, and the length direction of the plurality of first grooves is parallel to a second direction; and a second protruding bar is arranged between two adjacent first grooves; or the plurality of first grooves include a plurality of first sub-grooves extending along a first direction and a plurality of second sub-grooves extending along a second direction, and the plurality of first sub-grooves and the plurality of second sub-grooves are defined in an intersecting manner; and a bump is arranged between two adjacent first sub-grooves and between two adjacent second sub-grooves, the second direction intersects with the first direction.

[0008] In some embodiments, the plurality of first grooves include the plurality of first sub-grooves and the plurality of second sub-grooves; and the plurality of first sub-grooves cooperate with the plurality of second sub-grooves to form a plurality of bumps distributed in an array.

[0009] In some embodiments, the end openings of the plurality of micropores that are away from the liquid absorbing surface are all arranged on the bottom surfaces of the plurality of first grooves; or the end openings of the plurality of micropores that are away from the liquid absorbing surface are all arranged on the end surfaces of the plurality of bumps that are away from the liquid absorbing surface; or some end openings of the plurality of micropores that are away from the liquid absorbing surface are arranged on the bottom surfaces of the plurality of first grooves, and the other end openings of the plurality of micropores that are away from the liquid absorbing surface are arranged on the end surfaces of the plurality of bumps that are away from the liquid absorbing surface.

[0010] In some embodiments, the end openings of the plurality of micropores that are away from the liquid absorbing surface are all arranged on the bottom surfaces of the plurality of first grooves; or the plurality of micropores are distributed in an array, each of the plurality of first sub-grooves corresponds to one row of micropores, and each of the plurality of second sub-grooves correspond to one column of micropores; and a plurality of rows of bumps and a plurality of rows of micropores are arranged alternately, and a plurality of columns of bumps and a plurality of columns of micropores are arranged alternately.

[0011] In some embodiments, the heating body further includes a heating film, the heating film is arranged on the surface of the wetting structure, the heating film is configured to heat and atomize the aerosol-generation substance, the heating component exposes its corresponding micropores.

[0012] In some embodiments, the heating body further includes a heating film, the heating film includes a first part, a second part, a third part, and a fourth part, the first part is arranged on the side wall and the bottom wall of each of the plurality of first sub-grooves, the second part is arranged on the side wall and the bottom wall of each of the plurality of second sub-grooves, the third part is arranged on an end surface of each of the plurality of bumps that is away from the liquid absorbing surface, and the fourth part extends to the pore wall of a corresponding micropore.

[0013] In some embodiments, the width of the first groove ranges from 1 μm to 100 μm.

[0014] In some embodiments, the width of the first groove is less than or equal to 1.2 times of the diameter of the micropores.

[0015] In some embodiments, the depth of the first groove ranges from 1 μm to 200 μm.

[0016] In some embodiments, the depth of the first groove ranges from 1 μm to 50 μm.

[0017] In some embodiments, the plurality of micropores are defined in an array and the array includes a plurality of micropore columns parallel to a first direction; the wetting structure includes a plurality of first sub-grooves, the extending direction of each of the plurality of first sub-grooves is parallel to the first direction, and each of the plurality of first sub-grooves at least corresponds to one column of the plurality of micropores parallel to the first direction.

[0018] In some embodiments, the plurality of micropores include a plurality of micropore columns parallel to a second direction, the wetting structure includes a plurality of second sub-grooves, the extending direction of each of the plurality of second sub-grooves is parallel to the second direction, and each of the plurality of second sub-grooves at least corresponds to one column of the plurality of micropores parallel to the second direction, where the plurality of first sub-grooves and the plurality of second sub-grooves are communicated in an intersecting manner to form a mesh structure.

[0019] In some embodiments, the heating body further includes a positive electrode and a negative electrode, and two ends of the heating film are electrically connected to the positive electrode and the negative electrode respectively; and the first direction is a direction approaching the negative electrode along the positive electrode.

[0020] In some embodiments, the surface of the heating film is a lipophilic structure and/or the surface of the heating film that is away from the dense substrate includes a frosted structure or a sandblasting structure.

[0021] In some embodiments, the thickness of the heating film ranges from 200 nm to 5 μm; and the material of the heating film is one or more of aluminum or aluminum alloy, copper or copper alloy, silver or silver alloy, nickel or nickel alloy, chromium or chromium alloy, platinum or platinum alloy, titanium or titanium alloy, zirconium or zirconium alloy, palladium or palladium alloy, iron or iron alloy, gold or gold alloy, molybdenum or molybdenum alloy, niobium or niobium alloy, and tantalum or tantalum alloy.

[0022] In some embodiments, the thickness of the heating film ranges from 200 nm to 10 μm; and the material of the heating film is one or more of stainless steel, nickel-chromium-iron alloy, or nickel-based corrosion-resistant alloy.

[0023] In some embodiments, the atomizing surface is a frosted structure or a sandblasting structure to form the wetting structure.

[0024] In some embodiments, the liquid absorbing surface is a frosted structure or a sandblasting structure.

[0025] In some embodiments, the liquid absorbing surface includes a second concave-convex structure, the second concave-convex structure includes a plurality of second grooves, and the plurality of second grooves are fluidly coupled to the plurality of micropores.

[0026] In some embodiments, the material of the dense substrate is quartz, glass, or dense ceramic, and the plurality of micropores are designed orderly.

[0027] In some embodiments, the plurality of micropores are straight through holes, and the axis of each of the plurality of micropores is perpendicular to the dense substrate.

[0028] In some embodiments, the heating body further includes a liquid guiding member, where the liquid guiding member and the liquid absorbing surface of the dense substrate are spaced apart to form a gap; or the liquid guiding member is in contact with the liquid absorbing surface of the dense substrate.

[0029] In some embodiments, the liquid guiding member is made of porous ceramic or a cotton core; or the material of the liquid guiding member is dense, and a plurality of through holes are defined in the liquid guiding member.

[0030] In some embodiments, a plurality of transverse holes are further defined in the dense substrate, and the plurality of transverse holes are fluidly coupled to the plurality of micropores; and the axis of each of the plurality of transverse holes intersects with the axis of each of the plurality of micropores.

[0031] To resolve the foregoing technical problem, a second technical solution provided in the present disclosure is to provide an atomizer including a liquid storage cavity and any one of above heating bodies. The liquid storage cavity is configured to store an aerosol-generation substance, and the heating body is in fluidly coupled to the liquid storage cavity.

[0032] To resolve the foregoing technical problem, a third technical solution provided in the present disclosure is to provide an electronic atomizing device including above atomizer and a power supply assembly, and the power supply assembly is configured to supply electric energy for operation of the atomizer.

[0033] Technical effects of the present disclosure are as follows. Different from the related art, the present disclosure discloses a heating body, an atomizer, and an electronic atomizing device. The heating body includes a dense substrate, and the dense substrate includes a liquid absorbing surface and an atomizing surface arranged opposite to each other. A plurality of micropores are defined on the dense substrate, and the plurality of micropores extend through from the liquid absorbing surface to the atomizing surface. The atomizing surface is a wetting structure on which surface treatment is performed, and the wetting structure is fluidly coupled to the plurality of micropores. Therefore, a wetted area of the atomizing surface is enlarged, and the atomizing efficiency is improved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034] To describe the technical solutions in the embodiments of the present disclosure more clearly, the following briefly introduces the accompanying drawings required for describing the embodiments. Apparently, the accompanying drawings in the following description show merely some embodiments of the present disclosure, and those skilled in the art may still derive other accompanying drawings from these accompanying drawings without creative efforts.

FIG. 1 is a structural schematic view of an electronic atomizing device according to an embodiment of the present disclosure.
FIG. 2 is a structural schematic view of an atomizer of the electronic atomizing device provided in FIG. 1.
FIG. 3 is a structural schematic view of a heating body according to a first embodiment of the atomizer provided in FIG. 2.
FIG. 4 is a structural schematic view of the heating body provided in FIG. 3 viewed from one side of an atomizing surface.
FIG. 5 is a structural schematic view of the heating body provided in FIG. 3 viewed from one side of a liquid absorbing surface.
FIG. 6 is a schematic partially enlarged structural schematic view of FIG. 3.
FIG. 7 is a structural schematic view of a first concave-convex structure according to embodiment of the heating body provided in FIG. 3.
FIG. 8 is a structural schematic view of a first concave-convex structure according to another embodiment of the heating body provided in FIG. 3.
FIG. 9 is a structural schematic view of a first concave-convex structure according to still another embodiment of the heating body provided in FIG. 3.
FIG. 10 is a structural schematic view of a heating body according to a second embodiment of the atomizer provided in FIG. 2.
FIG. 11 is a structural schematic view of a heating body according to a third embodiment of the atomizer provided in FIG. 2.
FIG. 12 is a structural schematic view a heating body according to a third embodiment of the atomizer provided in FIG. 2.
FIG. 13 is a structural schematic view of a dense substrate of a heating body according to a fifth embodiment of the atomizer provided in FIG. 2.

DETAILED DESCRIPTION

[0035] The technical solutions in the embodiments of the present disclosure are clearly and completely described below with reference to the accompanying drawings in the embodiments of the present disclosure. Apparently, the described embodiments are merely some rather than all of the embodiments of the present disclosure. All other embodiments obtained by those skilled in the art based on the embodiments of the present disclosure without creative efforts shall fall within the protection scope of the present disclosure.

[0036] In the following description, for the purpose of illustration rather than limitation, specific details such as the particular system structure, interface, and technology are provided to thoroughly understand the present disclosure.

[0037] Terms "first", "second", and "third" in the present disclosure are merely intended for a purpose of description, and cannot be understood as indicating or implying relative significance or implicitly indicating the number of indicated technical features. Therefore, features defined with "first", "second", and "third" can explicitly or implicitly include at least one of the features. In the description of the present disclosure, term "a plurality of" means at least two, such as two and three unless it is specifically defined otherwise. All directional indications (for example, upper, lower, left, right, front, and rear, etc.) in the embodiments of the present disclosure are only used for explaining relative position relationships, movement situations, or the like between various components in a particular posture (as shown in the accompanying drawings). When the particular posture changes, the directional indications change accordingly. In the embodiments of the present disclosure, terms "include", "have", and any variant thereof are intended to cover a non-exclusive inclusion. For example, a process, a method, a system, a product, or a device that includes a series of steps or units is not limited to the listed steps or units, but further optionally includes a step or unit that is not listed, or further optionally includes other step or component that is intrinsic to the process, the method, the product, or the device.

[0038] Term "embodiment" mentioned in the present disclosure means that particular features, particular structures, or particular characteristics described with reference to the embodiment may be included in at least one embodiment of the present disclosure. The term appearing at different positions of the present disclosure may not refer to the same embodiment or an independent or alternative embodiment that is mutually exclusive with other embodiments. Those skilled in the art explicitly or implicitly understands that the embodiments described in the present disclosure may be combined with other embodiments.

[0039] The present disclosure is described in detail below with reference to the accompanying drawings and the embodiments.

[0040] Referring to FIG. 1, FIG. 1 is a structural schematic view of an electronic atomizing device according to an embodiment of the present disclosure.

[0041] In this embodiment, an electronic atomizing device 100 is provided. The electronic atomizing device 100 may be configured to atomize an aerosol-generation substance. The electronic atomizing device 100 includes an atomizer 1 and a power supply assembly 2 electrically connected to each other.

[0042] The atomizer 1 is configured to store an aerosol-generation substance and atomize the aerosol-generation substance to form aerosols that can be inhaled by a user. The atomizer 1 may be specifically applied to different fields such as medical care, cosmetology, and recreation inhalation. In a specific embodiment, the atomizer 1 may be applied to an electronic aerosol atomizing device to atomize an aerosol-generation substance and generate aerosols for inhalation by the user, and the following embodiments are described by taking the recreation inhalation as an example.

[0043] For a specific structure and functions of the atomizer 1, reference may be made to the specific structure and functions of the atomizer 1 provided in the following embodiments, same or similar technical effects may also be implemented, and details are not described herein again.

[0044] The power supply assembly 2 includes a battery (not shown in the drawing) and a controller (not shown in the drawing). The battery is configured to supply electric energy for operation of the atomizer 1, so as to enable the atomizer 1 to atomize the aerosol-generation substance to form aerosols. The controller is configured to control operation of the atomizer 1. The power supply assembly 2 further includes other components such as a battery holder and an airflow sensor.

[0045] The atomizer 1 and the power supply assembly 2 may be integrally arranged or may be detachably connected to each other, which may be designed according to a specific requirement.

[0046] Referring to FIG. 2, FIG. 2 is a structural schematic view of an atomizer of the electronic atomizing device provided in FIG. 1.

[0047] The atomizer 1 includes a housing 10, a heating body 11, and an atomizing base 12. The atomizing base 12 includes a mounting cavity (not labeled in the drawing), and the heating body 11 is arranged in the mounting cavity; and the heating body 11 is arranged together with the atomizing base 12 in the housing 10. The housing 10 defines an air outlet channel 13, an inner surface of the housing 10, an outer surface of the air outlet channel 13, and a top surface of the atomizing base 12 cooperate to form a liquid storage cavity 14, and the liquid storage cavity 14 is configured to store a liquid aerosol-generation substance. The heating body 11 is electrically connected to the power supply assembly 2, so as to atomize the aerosol-generation substance to generate aerosols.

[0048] The atomizing base 12 includes an upper base 121 and a lower base 122, and the upper base 121 and the lower base 122 cooperate to form the mounting cavity; and an atomizing surface of the heating body 11 and a cavity wall of the mounting cavity cooperate to form an atomizing cavity 120. A liquid supplying channel 1211 is defined in the upper base 121. The aerosol-generation substance in the liquid storage cavity 14 flows into the heating body 11 through the liquid supplying channel 1211, namely, the heating body 11 is in fluidly coupled to the liquid storage cavity 14. An air inlet channel 15 is defined in the lower base 122, external air enters the atomizing cavity 120 through the air inlet channel 15, carries aerosols atomized by the heating body 11 to flow to the air outlet channel 13, and the user inhales the aerosols through an end opening of the air outlet channel 13.

[0049] Referring to FIG. 3 to FIG. 6, FIG. 3 is a structural schematic view of a heating body according to a first embodiment of the atomizer provided in FIG. 2, FIG. 4 is a structural schematic view of the heating body provided in FIG. 3 viewed from one side of an atomizing surface, FIG. 5 is a structural schematic view of the heating body provided in FIG. 3 viewed from one side of a liquid absorbing surface, and FIG. 6 is a schematic partially enlarged structural schematic view of FIG. 3.

[0050] The heating body 11 includes a dense substrate 111, and the dense substrate 111 includes a liquid absorbing surface 1111 and an atomizing surface 1112 arranged opposite to each other. A plurality of micropores 1113 are defined on the dense substrate 111, the plurality of micropores 1113 are through holes extending through from the liquid absorbing surface 1111 to the atomizing surface 1112, and the plurality of micropores 1113 are designed orderly. The plurality of micropores 1113 are configured to guide the aerosol-generation substance from the liquid absorbing surface 1111 to the atomizing surface 1112. That is, the aerosol-generation substance in the liquid storage cavity 14 flows to the liquid absorbing surface 1111 of the dense substrate 111 through the liquid supplying channel 1211, and is guided to the atomizing surface 1112 through the capillary force of the plurality of micropores 1113. In other words, under the action of the gravity and/or the capillary force, the aerosol-generation substance flows from the liquid absorbing surface to the atomizing surface. The aerosol-generation substance is heated and atomized on the atomizing surface of the heating body 11 to generate aerosols. The atomizing surface 1112 is a wetting structure on which surface treatment is performed, and the wetting structure is fluidly coupled to the plurality of micropores 1113. The liquid absorbing surface 1111 is a smooth surface.

[0051] It should be understood that, because the aerosol-generation substance is atomized on the atomizing surface 1112 to generate aerosols, by arranging the wetting structure on the atomizing surface 1112, a wetted area of the atomizing surface 1112 is enlarged, such that more aerosol-generation substances may be attached to the atomizing surface 1112, thereby improving the atomizing efficiency.

[0052] The material of the dense substrate 111 is glass, dense ceramic, silicon, or quartz. When the material of the dense substrate 111 is glass, the glass may be one of common glass, quartz glass, borosilicate glass, or photosensitive lithium aluminosilicate glass.

[0053] The dense substrate 111 is in a shape of a sheet. It should be understood that, a sheet-like body is described compared to a block-shaped body, a ratio of the length to the thickness of a sheet-like body is greater than a ratio of the length to the thickness of a block-shaped body; and for example, the dense substrate 111 may be in a shape of a rectangular sheet. The dense substrate 111 may also be in a shape of a plate, an arc, or a cylinder, which is specifically designed as required, and other structures of the atomizer 1 are matched with the shape of the dense substrate 111. The plurality of micropores 1113 on the dense substrate 111 are straight through holes extending through two opposite surfaces of the dense substrate 111, and the axis of each of the plurality of micropores 1113 is perpendicular to the dense substrate 111. That is, the extending direction of each of the plurality of micropores 1113 is perpendicular to the dense substrate 111.

[0054] The diameter of the micropores 1113 on the dense substrate 111 ranges from 1 μm to 100 μm. When the diameter of the micropores 1113 is less than 1 μm, the liquid supplying requirement cannot be met, thereby leading to a decrease of the amount of aerosols. When the diameter of the micropores 1113 is greater than 100 μm, the aerosol-generation substance may easily leak out from the plurality of micropores 1113 to cause liquid leakage. In some embodiments, the diameter of the micropores 1113 ranges from 20 μm to 50 μm. It should be understood that the diameter of the micropores 1113 is selected according to an actual requirement.

[0055] A thickness of the dense substrate 111 ranges from 0.1 mm to 2 mm. The thickness of the dense substrate 111 is the distance between the liquid absorbing surface 1111 and the atomizing surface 1112. When the thickness of the dense substrate 111 is greater than 2 mm, the liquid supplying requirement cannot be met, thereby leading to a decrease of the amount of aerosols, a great heat loss, and high costs of the dense substrate 111. When the thickness of the dense substrate 111 is less than 0.1 mm, the intensity of the dense substrate 111 cannot be ensured, which is not conducive to improve the performance of the electronic atomizing device. Optionally, the thickness of the dense substrate 111 ranges from 0.3 mm to 0.8 mm. It should be understood that the thickness of the dense substrate 111 is selected according to an actual requirement.

[0056] The ratio of the thickness of the dense substrate 111 to the diameter of the micropores 1113 ranges from 20:1 to 3:1 to improve a liquid supplying capability. When the ratio of the thickness of the dense substrate 111 to the diameter of the micropores 1113 is greater than 20:1, the aerosol-generation substance supplied through the capillary force of each of the plurality of micropores 1113 can hardly meet an atomizing requirement, which easily leads to dry burning and a decrease of the amount of aerosols generated in single atomiation. When the ratio of the thickness of the dense substrate 111 to the diameter of the micropores 1113 is less than 3:1, the aerosol-generation substance may easily leak out from each of the plurality of micropores 1113 to cause a waste and lead to a decrease of the atomizing efficiency, thereby leading a decrease of the total amount of aerosols. In some embodiments, the ratio of the thickness of the dense substrate 111 to the diameter of the micropores 1113 ranges from 15:1 to 5:1.

[0057] The ratio of a distance between centers of two adjacent micropores 1113 to the diameter of the micropores 1113 ranges from 3:1 to 1.5:1, such that the intensity of the dense substrate 111 is improved as much as possible in a case that the plurality of micropores 1113 on the dense substrate 111 have the liquid supplying capability. In some embodiments, the ratio of the distance between centers of two adjacent micropores 1113 to the diameter of the micropores 1113 ranges from 3:1 to 2:1. In some embodiments, the ratio of the distance between centers of two adjacent micropores 1113 to the diameter of the micropores 1113 ranges from 3:1 to 2.5:1.

[0058] In this embodiment, the heating body 11 further includes a heating component 112, a positive electrode 113, and a negative electrode 114, and two ends of the heating component 112 are electrically connected to the positive electrode 113 and the negative electrode 114 respectively. The heating component 112 is configured to atomize the aerosol-generation substance. The heating component 112 is arranged on the atomizing surface 1112 of the dense substrate 111, namely, the heating component 112 is arranged on the surface of the wetting structure, thereby heating and atomizing the aerosol-generation substance to generate aerosols. The positive electrode 113 and the negative electrode 114 are both arranged on the atomizing surface 1112 of the dense substrate 111 to be electrically connected to the power supply assembly 2. The heating component 112 may be a component such as a heating sheet, a heating film, or a heating mesh to heat and atomize the aerosol-generation substance. In another embodiment, the heating component 112 may be arranged inside the dense substrate 111. In still another embodiment, the dense substrate 111 is at least partially conductive to serve as the heating component 112.

[0059] In some embodiments, the heating component 112 is a heating film, the thickness of the heating film ranges from 200 nm to 5 μm, and the material of the heating film is one or more of aluminum or aluminum alloy, copper or copper alloy, silver or silver alloy, nickel or nickel alloy, chromium or chromium alloy, platinum or platinum alloy, titanium or titanium alloy, zirconium or zirconium alloy, palladium or palladium alloy, iron or iron alloy, gold or gold alloy, molybdenum or molybdenum alloy, niobium or niobium alloy, and tantalum or tantalum alloy.

[0060] In some embodiments, the heating component 112 is a heating film, the thickness of the heating film ranges from 200 nm to 10 μm, and the material of the heating film is one or more of stainless steel (304, 316L, 317L, or 904L, etc.), nickel-chromium-iron alloy (inconel625 or inconel718, etc.), or nickel-based corrosion-resistant alloy (nickel-molybdenum alloy B-2 or nickel-chromium-molybdenum alloy C-276, etc.).

[0061] In some other embodiments, the aerosol-generation substance may be atomized through a manner such as microwave heating or laser heating, etc., which is specifically designed as required.

[0062] The following describes the heating body 11 in detail by taking an example that the heating component 112 performs heating, the heating component 112 is arranged on the surface of the wetting structure, and the heating component 112 is a heating film.

[0063] In some embodiments, the heating film is formed on the atomizing surface 1112 of the dense substrate 111 through a physical vapor deposition process. The heating film exposes its corresponding micropores 1113 (as shown in FIG. 3 and FIG. 4).

[0064] Referring to FIG. 4 and FIG. 5, in this embodiment, the plurality of micropores 1113 are merely arranged on a part of the surface of the dense substrate 111 in an array. Specifically, a microporous array region 1114 and a blank region 1115 arranged surrounding a periphery of the microporous array region 1114 are arranged on the dense substrate 111. The microporous array region 1114 includes the plurality of micropores 1113, and no micropore 1113 is arranged on the blank region 1115. The heating component 112 is arranged on the microporous array region 1114 to heat and atomize the aerosol-generation substance, and the positive electrode 113 and the negative electrode 114 are arranged in the blank region 1115 on the atomizing surface 1112 to ensure the stability of the electrical connection between the positive electrode 113 and the negative electrode 114.

[0065] Since the microporous array region 1114 and the blank region 1115 arranged surrounding the periphery of the microporous array region 1114 are arranged on the dense substrate 111, the number of micropores 1113 on the dense substrate 111 is reduced, such that the intensity of the dense substrate 111 is improved and the costs for defining the micropores 1113 on the dense substrate 111 are reduced. The microporous array region 1114 in the dense substrate 111 are served as an atomizing region and covers the heating component 112 and the region around the heating component 112, that is, the microporous array region 1114 covers a region reaching a temperature for atomizing the aerosol-generation substance, such that the thermal efficiency is fully utilized.

[0066] It should be understood that only when the size of a region around the microporous array region 1114 of the dense substrate 111 in the present disclosure is greater than the diameter of the micropores 1113, can the region be referred to as the blank region 1115. That is, the blank region 1115 in the present disclosure is a region in which micropores 1113 can be formed but no micropore 1113 is formed, rather than a region around the microporous array region 1114 in which micropores 1113 cannot be formed. In some embodiments, it is considered that a blank region 1115 is arranged surrounding the microporous array region 1114 only when a distance between a micropore 1113 that is closest to the boundary of the dense substrate 111 and the boundary of the dense substrate 111 is greater than the diameter of the dense substrate 111.

[0067] In this embodiment, the atomizing surface 1112 of the dense substrate 111 includes a first concave-convex structure 1116 to form the wetting structure. The first concave-convex structure 1116 includes a plurality of first grooves 1116a, the plurality of first grooves 1116a are fluidly coupled to the plurality of micropores 1113. The capillary force of the plurality of first grooves 1116a can guide the aerosol-generation substance from the plurality of micropores 1113 into the plurality of first grooves 1116a, and a part of the heating film (the heating component 112) is deposited in the plurality of first grooves 1116a. The plurality of first grooves 1116a crosses the microporous array region 1114. It should be understood that, compared with a case that the atomizing surface is a smooth surface, the atomizing surface 1112 includes the plurality of first grooves 1116a, and the aerosol-generation substance may be stored in the plurality of first grooves 1116a, such that the area of the atomizing surface 1112 is enlarged, and the contact area between the aerosol-generation substance and the heating film (the heating component 112) is also enlarged, thereby enlarging the effective atomizing area and being conducive to improve the atomizing efficiency. In addition, since the plurality of first grooves 1116a have the capillary force, the aerosol-generation substance in the plurality of first grooves 1116a may not reflux to the liquid storage cavity 14, and the aerosol-generation substance in the plurality of first grooves 1116a is directly atomized, such that repeated heating is avoided, and an aerosol reduction degree is relatively high. Moreover, since after the electronic atomizing device is stopped for a period, a certain amount of aerosol-generation substances may be stored in the plurality of first grooves 1116a, and dry burning may not occur even if the user inversely places the electronic atomizing device and inhales for several times during next use.

[0068] In some embodiments, the width of the first groove 1116a ranges from 1 μm to 100 μm. When the width of the first groove 1116a is greater than 100 μm, the capillary force of the plurality of first grooves 1116a is not strong, and the atomizing efficiency is not apparently improved. When the width of the first groove 1116a is less than 1 μm, the flow resistance is excessively great, such that the aerosol-generation substance flows slow.

[0069] In some embodiments, the width of the first groove 1116a is less than or equal to 1.2 times of the diameter of the micropores 1113, thereby ensuring that the capillary force of the plurality of first grooves 1116a meets a requirement.

[0070] In some embodiments, the depth of the first groove 1116a ranges from 1 μm to 200 μm. When the depth of the first groove 1116a is less than 1 μm, the capillary force of the plurality of first grooves 1116a is not strong, and the aerosol-generation substance in the plurality of micropores 1113 can be hardly guided to the plurality of first grooves 1116a, thereby leading to dry burning in the plurality of first grooves 1116a. When the depth of the first groove 1116a is greater than 200 μm, e- liquid explosion may easily occur, the heating film (the heating component 112) can be hardly formed in the plurality of first grooves 1116a. When the dense substrate 111 is quite thin and the depth of the first groove 1116a is excessively great, the intensity may be easily affected. In some embodiments, the depth of the first groove 1116a ranges from 1 μm to 50 μm, such that e-liquid explosion may be prevented and the particle size of aerosols may be prevented from being excessively great. When the particle size of aerosols needs to be greater, the depth of the first groove 1116a may range from 50 μm to 200 μm.

[0071] In some embodiments, the plurality of first grooves 1116a are defined parallel to each other, and the length direction of each of the plurality of first grooves 1116a is parallel to a first direction; and a first protruding bar 1116b is arranged between two adjacent first grooves 1116a (as shown in FIG. 7, FIG. 7 is a structural schematic view of a first concave-convex structure according to an embodiment of the heating body provided in FIG. 3). The first direction is a direction approaching the negative electrode 114 along the positive electrode 113. The plurality of micropores 1113 are defined in an array and the array includes a plurality of micropore columns parallel to the first direction, and each of the plurality of first grooves 1116a at least corresponds to one columnof the plurality of micropores parallel to the first direction. In this case, the first concave-convex structure 1116 includes a plurality of first grooves 1116a and a plurality of first protruding bars 1116b.

[0072] In some embodiments, the end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are all arranged on the bottom surfaces of the plurality of first grooves 1116a (as shown in FIG. 7). Or the end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are all arranged on the end surfaces of the plurality of first protruding bars 1116b that are away from the liquid absorbing surface 1111. Or some of the end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are arranged on the bottom surfaces of the plurality of first grooves 1116a, and the other end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are arranged on the end surfaces of the plurality of first protruding bars 1116b that are away from the liquid absorbing surface 1111.

[0073] In some embodiments, an end opening of a micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on a bottom surface of each of the plurality of first grooves 1116a (as shown in FIG. 7). Or the end opening of the micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on an end surface of each of the plurality of first protruding bars 1116b that is away from the liquid absorbing surface 1111. Or a part of the end opening of the micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on the bottom surface of each of the plurality of first grooves 1116a, and the other part of the end opening of the micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on the end surface of each of the plurality of first protruding bars 1116b that is away from the liquid absorbing surface 1111.

[0074] In some embodiments, the heating film includes a first part, a second part, and a third part. the first part of the heating film (the heating component 112) is arranged on the side wall and the bottom wall of each of the plurality of first grooves 1116a, the second part is arranged on the end surface of each of the plurality of first protruding bars 1116b that is away from the liquid absorbing surface 1111, and the third part extends to the pore wall of a corresponding micropore 1113. Since the part of the heating film that is arranged on the side wall and/or the bottom wall of each of the plurality of first grooves 1116a is directly electrically connected to the positive electrode 113 and the negative electrode 114, a current flows through the part of the heating film arranged on the side wall and/or the bottom wall of each of the plurality of first grooves 1116a, such that heat may be directly generated to heat the aerosol- generation substrate in the plurality of first grooves 1116a and the plurality of micropores 1113, thereby improving the energy utilization.

[0075] In another embodiment, the plurality of first grooves 1116a are defined parallel to each other, and the length direction of each of the plurality of first grooves 1116a is parallel to a second direction. A second protruding bar 1116c is arranged between two adjacent first grooves 1116a (as shown in FIG. 8, FIG. 8 is a structural schematic view of a first concave-convex structure according to another embodiment of the heating body provided in FIG. 3). The second direction intersects with the first direction. For example, an angle between the second direction and the first direction is 90 degrees. The plurality of micropores 1113 are defined in an array and the array includes a plurality of micropore columns parallel to the second direction, and each of the plurality of first grooves 1116a at least corresponds to one column of the plurality of micropores parallel to the second direction. In this case, the first concave-convex structure 1116 includes a plurality of first grooves 1116a and a plurality of second protruding bars 1116c. It should be understood that the angle between the second direction and the first direction is not limited to 90 degrees and may also be an acute angle or an obtuse angle.

[0076] In some embodiments, the end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are all arranged on the bottom surfaces of the plurality of first grooves 1116a (as shown in FIG. 8). Or the end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are all arranged on the end surfaces of the plurality of second protruding bars 1116c that are away from the liquid absorbing surface 1111. or a some end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are arranged on the bottom surfaces of the plurality of first grooves 1116a, and the other end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are arranged on the end surfaces of the plurality of second protruding bars 1116c that are away from the liquid absorbing surface 1111.

[0077] In some embodiments, an end opening of a micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on a bottom surface of each of the plurality of first grooves 1116a (as shown in FIG. 8). Or the end opening of the micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on an end surface of each of the plurality of second protruding bars 1116c that is away from the liquid absorbing surface 1111. Or a part of the end opening of the micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on the bottom surface of each of the plurality of first grooves 1116a, and the other part of the end opening of the micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on the end surface of each of the plurality of second protruding bars 1116c that is away from the liquid absorbing surface 1111.

[0078] In some embodiments, the heating film includes a first part, a second part, and a third part, the first part of the heating film (the heating component 112) is arranged on the side wall and the bottom wall of each of the plurality of first grooves 1116a, the second part is arranged on the end surface of each of the plurality of second protruding bars 1116c that is away from the liquid absorbing surface 1111, and the third part extends to the pore wall of a corresponding micropore 1113. Since the part of the heating film that is arranged on the side wall and/or the bottom wall of each of the plurality of first grooves 1116a is directly electrically connected to the positive electrode 113 and the negative electrode 114, a current flows through the part of the heating film arranged on the side wall and/or the bottom wall of each of the plurality of first grooves 1116a, such that heat may be directly generated to heat the aerosol-generation substance in the plurality of first grooves 1116a and the plurality of micropores 1113, thereby improving the energy utilization.

[0079] In still another implementation, the plurality of first grooves 1116a include a plurality of first sub-grooves A extending along the first direction and a plurality of second sub-grooves B extending along the second direction, and the plurality of first sub-grooves A and the plurality of second sub-grooves B are defined in an intersecting manner. A bump 1116d is arranged between two adjacent first sub-grooves A and between two adjacent second sub-grooves B (as shown in FIG. 9, FIG. 9 is a structural schematic view of a first concave-convex structure according to still another embodiment of the heating body provided in FIG. 3). The first direction is a direction approaching the negative electrode 114 along the positive electrode 113, and the second direction intersects with the first direction. For example, an angle between the second direction and the first direction is 90 degrees. In this case, the first concave-convex structure 1116 includes a plurality of first sub-grooves A, a plurality of second sub-grooves B, and a plurality of bumps 1116d. It can be understood that, the angle between the second direction and the first direction is not limited to 90 degrees and may also be an acute angle or an obtuse angle. The plurality of first sub-grooves A and the plurality of second sub-grooves B are communicated in an intersecting manner to form a mesh structure.

[0080] In some embodiments, the end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are all arranged on the bottom surfaces of the plurality of first grooves 1116a (as shown in FIG. 9). Or the end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are all arranged on the end surfaces of the plurality of bumps 1116d that are away from the liquid absorbing surface 1111. Or some of the end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are arranged on the bottom surfaces of the plurality of first grooves 1116a, and the other end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are arranged on the end surfaces of the plurality of bumps 1116d that are away from the liquid absorbing surface 1111.

[0081] In some embodiments, an end opening of a micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on a bottom surface of each of the plurality of first grooves 1116a (as shown in FIG. 9). Or the end opening of the micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on an end surface of each of the plurality of bumps 1116d that is away from the liquid absorbing surface 1111. Or a part of the end opening of the same micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on the bottom surface of each of the plurality of first grooves 1116a, and the other part of the end opening of the same micropore 1113 that is away from the liquid absorbing surface 1111 is arranged on the end surface of each of the plurality of bumps 1116d that is away from the liquid absorbing surface 1111.

[0082] In some embodiments, the plurality of first sub-grooves A cooperate with the plurality of second sub-grooves B to form a plurality of bumps 1116d arranged in an array. The plurality of micropores 1113 are arranged in an array and the array includes a plurality of micropore columns parallel to the first direction and a plurality of micropore columns parallel to the second direction. An extending direction of each of the plurality of first sub-grooves A is parallel to the first direction, and each of the plurality of first sub-grooves A at least corresponds to one column of the plurality of micropores parallel to the first direction. An extending direction of each of the plurality of second sub-grooves B is parallel to the second direction, and each of the plurality of second sub-grooves B at least corresponds to one column of the plurality of micropores parallel to the second direction. The plurality of first sub-grooves A and the plurality of second sub-grooves B are communicated in an intersecting manner to form a mesh structure.

[0083] For example, the plurality of micropores 1113 are arranged in an array. The end openings of the plurality of micropores 1113 that are away from the liquid absorbing surface 1111 are all arranged on the bottom surfaces of the plurality of first grooves 1116a. Each of the plurality of first sub-grooves A corresponds to one column of the plurality of micropores parallel to the first direction, and each of the plurality of second sub-grooves B corresponds to one column of the plurality of micropores parallel to the second direction. A plurality of rows of bumps 1116d and a plurality of rows of micropores 1113 are arranged alternately, and a plurality of columns of bumps 1116d and a plurality of columns of micropores 1113 are arranged alternately (as shown in FIG. 9).

[0084] In some embodiments, the heating film includes a first part, a second part, a third part, and a fourth part. The first part of the heating film (the heating component 112) is arranged on a side wall and a bottom wall of each of the plurality of first sub-grooves A, the second part is arranged on a side wall and a bottom wall of each of the plurality of second sub-grooves B, the third part is arranged on the end surface of each of the plurality of bumps 1116d that is away from the liquid absorbing surface 1111, and the fourth part extends to a pore wall of a corresponding micropore 1113 (as shown in FIG. 6). Since the part of the heating film that is arranged on the side wall and/or the bottom wall of each of the plurality of first grooves 1116a is directly electrically connected to the positive electrode 113 and the negative electrode 114, a current flows through the part of the heating film arranged on the side wall and/or the bottom wall of each of the plurality of first grooves 1116a, such that heat may be directly generated to heat the aerosol-generation substance in the plurality of first grooves 1116a and the plurality of micropores 1113, thereby improving the energy utilization.

[0085] It should be noted that, when the atomizing surface of the heating body is a smooth surface and a heating film is formed on the atomizing surface through a physical vapor deposition process, the heating film includes a plane heating film, an in-hole heating film, and a corner connection region heating film. The plane heating film is arranged on the atomizing surface, the in-hole heating film is arranged in each of the plurality of micropores, and the corner connection region heating film connects the plane heating film and the in-hole heating film. Through simulation analysis on potentials of the heating body when powered on, it is found that in this type of heating bodies, currents substantially flow through the plane heating film and the corner connection region heating film, and almost no current flows through the in-hole heating film. Therefore, it may be determined that a region where the heating body actually generates heat is the plane heating film and the corner connection region heating film, and the in-hole heating film is a heat conduction region. Through observation on the atomizing surface during atomization, it is found that substantially no e-liquid film is formed on the atomizing surface no matter the atomizing surface works or does not work, such that it is determined that the in-hole heating film is actually configured for atomizing. In the simulation analysis on the potentials of the heating body when powered on, the in-hole heating film is a heat conduction region, such that the energy utilization of the heating film is relatively low, which is intuitively presented as a small atomizing amount. In addition, it is found through adverse inference that heat dissipation is only performed on the in-hole heating film to implement heat dissipation on the entire heating film, such that a problem such as a risk of dry burning or burnout is synchronously caused.

[0086] In the present disclosure, a wetting structure is configured as the atomizing surface 1112 of the dense substrate 111. For example, the atomizing surface 1112 includes the first concave-convex structure 1116, and the heating film (the heating component 112) is also formed on the side wall and the bottom wall of each of the plurality of first grooves 1116a of the first concave-convex structure 1116, such that the effective heating area of the heating component 112 is enlarged, thereby improving the energy utilization. A part of the aerosol-generation substance is guided by the plurality of first grooves 1116a to the grooves for atomization, thereby being conducive to improve the atomizing efficiency. Since atomization may be performed in the plurality of first grooves 1116a and the plurality of micropores 1113 at the same moment, the aerosol-generation substance in the plurality of micropores may be effectively prevented from being emptied instantly due to excessive atomization in the plurality of micropores, and a sound of air-back of inhalation caused by intaking air may be effectively avoided. In addition, the contact area between the aerosol-generation substance and the heating component 112 is enlarged through the first concave-convex structure 1116, such that a heat dissipation area of the heating component 112 is enlarged, thereby effectively preventing dry burning.

[0087] The inventor further found that compared with a case that the atomizing surface is a smooth surface and the heating film is deposited on the smooth surface, the vaporization surface 1112 being a wetting structure and the heating film being deposited on a coarse surface may apparently increases the atomizing amount. For example, the atomizing amount is increased from 6.2 mg/puff to 8.5 mg/puff. In addition, dirt accumulation is also apparently reduced, and the taste and sweetness of aerosols are also improved.

[0088] It should be understood that, a shape of a longitudinal section of each of the plurality of first grooves

1116a is a rectangle, a triangle, a circle, an arc, V/U, or Q, which is specifically designed as required. The longitudinal section refers to a section along a direction perpendicular to the dense substrate 111.

[0089] In other embodiments, the first concave-convex structure 1116 on the atomizing surface 1112 may cover a region on which the heating film (the heating component 112) is arranged. Or the first concave-convex structure 1116 on the atomizing surface 1112 may only cover a part of the region on which the heating film (the heating component 112) is arranged. Or the first concave-convex structure 1116 on the atomizing surface 1112 may cover a part of the region on which the heating film (the heating component 112) is arranged and cover a part of the blank region 1115. In this way, the energy utilization of the heating component 112 may be improved to some extent.

[0090] In other embodiments, the atomizing surface 1112 is configured as a frosted structure or a sandblasting structure to form a wetting structure, and same technical effects may be implemented when compared with the wetting structure formed by the first concave-convex structure 1116 included by the atomizing surface 1112, which are not described herein again.

[0091] Referring to FIG. 10, FIG. 10 is a structural schematic view of a heating body according to a second embodiment of the atomizer provided in FIG. 2.

[0092] Structures of the heating body 11 provided in FIG. 10 and the heating body 11 provided in FIG. 3 are substantially the same, and a difference lies in different structures of the liquid absorbing surface 1111 of the dense substrate 111. For the same parts of the heating body 11, details are not described herein again.

[0093] In this embodiment, the liquid absorbing surface 1111 includes a second concave-convex structure 1117, and the second concave-convex structure 1117 includes a plurality of second grooves 1117a; and for a specific arrangement manner of the second concave-convex structure 1117, reference may be made to the specific arrangement manner of the first concave-convex structure 1116, and details are not described herein again. The plurality of second grooves 1117a are fluidly coupled to the plurality of micropores 1113. Through arrangement of the plurality of second grooves 1117a, bubbles entering from the plurality of micropores 1113 are prevented from being attached to the liquid absorbing surface 1111 and growing up, thereby avoiding blocking liquid supplying of micropores 1113 in a surrounding region.

[0094] The present disclosure further provides a heating body 11. In this embodiment, a structure of the heating body 11 is substantially the same as the structure of the heating body 11 provided in FIG. 3, and a difference lies in different structures of the heating component 112. Specifically, the heating component 112 is a heating film, the heating film is a lipophilic structure and/or the surface of the heating film that is away from the dense substrate 111 includes a frosted structure or a sandblasting structure, such that a contact angle is small and the wettability is high, thereby being conducive to improve the energy utilization and the atomizing efficiency.

[0095] In a group of comparative experiments, in a case that other conditions remain unchanged, the dense substrate is quartz glass, the thickness of the dense substrate is 400 μm, the diameter of the micropore is 40 μm, a distance between two adjacent pores is 80 μm, the heating film is a thin film, and the power of the heating film is 6.5 W, the inventor performs atomizing amount comparison experiment on heating bodies (referring to FIG. 4) whose atomizing surface is a smooth surface and whose atomizing surface is defined a plurality of grooves. The depth of the groove ranges from 15 μm to 25 μm, the width of the groove ranges from 30 μm to 40 μm, and a result indicates that the atomizing amount is increased from 6.2 mg/per inhalation to 7.6 mg/per inhalation. That is, in a case that other conditions remain unchanged, by defining grooves on the atomizing surface of the dense substrate and arranging a part of the heating component in the grooves, the thermal utilization and the atomizing amount may be greatly improved.

[0096] Referring to FIG. 11, FIG. 11 is a structural schematic view of a heating body according to a third embodiment of the atomizer provided in FIG. 2.

[0097] Structures of the heating body 11 provided in FIG. 11 and the heating body 11 provided in FIG. 3 are substantially the same, and a difference lies in that the heating body 11 provided in FIG. 11 further includes a first protective film 115 and a second protective film 116. For the same parts of the two heating body, details are not described herein again.

[0098] The first protective film 115 is arranged on the surface of the heating component 112 that is away from the dense substrate 111, and the material of the first protective film 115 is a non-conductive material which can resist corrosion of the aerosol-generation substance. The second protective film 116 is arranged on surfaces of the positive electrode 113 and the negative electrode 114 that are away from the dense substrate 111, and the material of the second protective film 116 is a conductive material which can resist corrosion of the aerosol-generation substance. The first protective film 115 and the second protective film 116 effectively prevents corrosion of the aerosol-generation substance on the heating component 112, the positive electrode 113, and the negative electrode 114, thereby being conducive to improve the service life of the heating body 11.

[0099] In some embodiments, the material of the first protective film 115 is ceramic or glass. Since the material of the heating component 112 is metal, the thermal expansion coefficient of ceramic or glass matches the thermal expansion coefficient of the metal heating component 112, and the adhesion of ceramic or glass matches the adhesion of the metal heating component 112. Ceramic or glass is used as the first protective film 115, such that the first protective film 115 can hardly fall off a heating portion 1121, such that the heating portion is well protected.

[0100] When the material of the first protective film 115 is ceramic, the material of the ceramic may be one or more of aluminum nitride, silicon nitride, aluminum oxide, silicon oxide, silicon carbide, or zirconium oxide, which is specifically selected as required.

[0101] In some embodiments, the thickness of the first protective film 115 ranges from 10 nm to 1000 nm.

[0102] In some embodiments, the thickness of the second protective film 116 ranges from 10 nm to 2000 nm.

[0103] In some embodiments, the material of the second protective film 116 is conductive ceramic or metal. Compared with a case that the first protective film 115 is made of a non-conductive material, the second protective film 116 is made of a conductive material, such that the second protective film 116 does not affect the electrical connection between the positive electrode 113 and the power supply assembly 2 and the electrical connection between the negative electrode 114 and the power supply assembly 2 while protecting the positive electrode 113 and the negative electrode 114 from corrosion of the aerosol-generation substance. Conductive ceramic or metal is used as the second protective film 116, which is conducive to reduce contact resistance.

[0104] When the material of the second protective film 116 is conductive ceramic, the material of the conductive ceramic is one or more of titanium nitride and titanium diboride. It should be understood that conductive ceramic has better corrosion resistance of aerosol-generation substance than metal.

[0105] Referring to FIG. 12, FIG. 12 is a structural schematic view of a heating body according to a fourth embodiment of the atomizer provided in FIG. 2.

[0106] Structures of the heating body 11 provided in FIG. 12 and the heating body 11 provided in FIG. 3 are substantially the same, and a difference lies in that the heating body 11 provided in FIG. 12 further includes a liquid guiding member 117. For the same parts of the two heating body, details are not described herein again.

[0107] In some embodiments, the material of the liquid guiding member 117 is a porous material, such as porous ceramic or a cotton core, etc.

[0108] In some embodiments, the material of the liquid guiding member 117 is dense, such as dense ceramic or glass, etc. In this case, a plurality of through holes (not shown in the drawing) are defined in the liquid guiding member 117, and the plurality of through holes have the capillary force.

[0109] In some embodiments, the liquid guiding member 117 is in contact with the liquid absorbing surface 1111 of the dense substrate 111 (as shown in FIG. 12). The aerosol-generation substance is guided to the liquid absorbing surface 1111 of the dense substrate 111 through the capillary force of the liquid guiding member 117.

[0110] In some embodiments, the liquid guiding member 117 and the liquid absorbing surface 1111 of the dense substrate 111 are arranged opposite to each other and spaced apart to form a gap (not shown in the drawing). The aerosol-generation substance is guided to the gap through the capillary force of the liquid guiding member 117, and then enters the liquid absorbing surface 1111 of the dense substrate 111.

[0111] By arranging the liquid guiding member 117 on one side of the liquid absorbing surface 1111 of the dense substrate 111, a liquid supplying speed is further controlled.

[0112] Referring to FIG. 13, FIG. 13 is a structural schematic view of a heating body according to a fifth embodiment of the atomizer provided in FIG. 2.

[0113] Structures of the heating body 11 provided in FIG. 13 and the heating body 11 provided in FIG. 3 are substantially the same, and a difference lies in that a plurality of transverse holes 1118 are further defined in the dense substrate 111 of the heating body 11. For the same parts of the two heating body, details are not described herein again.

[0114] The plurality of transverse holes 1118 fluidly couples the plurality of micropores 1113. The axis of each of the plurality of transverse holes 1118 intersects with the axis of each of the plurality of micropores 1113. In some embodiments, the axis of each of the plurality of transverse holes 1118 is perpendicular to the axis of each of the plurality of micropores 1113.

[0115] The plurality of micropores 1113 and the plurality of transverse holes 1118 form a mesh microfluidic channel, and bubbles may enter the plurality of micropores 1113 during atomization. By defining the plurality of transverse holes 1118, bubbles entering the heating body 11 through adjacent micropores 1113 may be prevented from being connected, namely, bubbles entering the heating body 11 through adjacent micropores 1113 may be prevented from being growing up. In addition, even if the bubbles enter the liquid absorbing surface 1111 from the atomizing surface 1112 through the plurality of micropores 1113, are attached to the liquid absorbing surface 1111, and grow up to block some micropores 1113, the plurality of transverse holes 1118 may supplement aerosol-generation substances to the blocked micropores 1113, such that e-liquid is supplied to the atomizing surface 1112 in time, thereby preventing dry burning. The plurality of transverse holes 1118 further have a liquid storage function, thereby avoiding burnout when the user inversely places the electronic atomizing device and inhales for at least two times.

[0116] It should be understood that features of the heating body 11 of the first embodiment, the heating body of the second embodiment 11, the heating body 11 of the third embodiment, the heating body 11 of the fourth embodiment, and the heating body 11 of the fifth embodiment may be randomly combined as required.

[0117] The foregoing descriptions are merely embodiments of the present disclosure, and the scope of the present disclosure is not limited to foregoing descriptions. All equivalent structure or process changes made according to the content of this specification and the accompanying drawings in the present disclosure or by directly or indirectly applying the present disclosure in other related technical fields shall fall within the protection scope of the present disclosure.

Claims

1. A heating body, applied to an electronic atomizing device and configured to heat and atomize an aerosol-generation substance, and the heating body comprising:

   a dense substrate, comprising a liquid absorbing surface and an atomizing surface arranged opposite to each other;
   wherein a plurality of micropores are defined on the dense substrate, and the plurality of micropores extend through from the liquid absorbing surface to the atomizing surface, and the atomizing surface is a wetting structure on which surface treatment is performed, and the wetting structure is fluidly coupled to the plurality of micropores.

2. The heating body according to claim 1, wherein the atomizing surface comprises a first concave-convex structure to form the wetting structure, the first concave-convex structure comprises a plurality of first grooves, and the plurality of first grooves are fluidly coupled to the plurality of micropores.

3. The heating body according to claim 2, wherein the plurality of first grooves are defined parallel to each other, and the length direction of the plurality of first grooves is parallel to a first direction, and a first protruding bar is arranged between two adjacent first grooves; or

   the plurality of first grooves are defined parallel to each other, and the length direction of the plurality of first grooves is parallel to a second direction, and a second protruding bar is arranged between two adjacent first grooves; or
   the plurality of first grooves comprise a plurality of first sub-grooves extending along a first direction and a plurality of second sub-grooves extending along a second direction, and the plurality of first sub-grooves and the plurality of second sub-grooves are defined in an intersecting manner; and a bump is arranged between two adjacent first sub-grooves and between two adjacent second sub-grooves, wherein the second direction intersects with the first direction.

4. The heating body according to claim 3, wherein the plurality of first grooves comprise the plurality of first sub-grooves and the plurality of second sub-grooves; and the plurality of first sub-grooves cooperate with the plurality of second sub-grooves to form a plurality of bumps distributed in an array.

5. The heating body according to claim 4, wherein the end openings of the plurality of micropores that are away from the liquid absorbing surface are all arranged on the bottom surfaces of the plurality of first grooves; or

   the end openings of the plurality of micropores that are away from the liquid absorbing surface are all arranged on the end surfaces of the plurality of bumps that are away from the liquid absorbing surface; or
   some end openings of the plurality of micropores that are away from the liquid absorbing surface are arranged on the bottom surfaces of the plurality of first grooves, and the other end openings of the plurality of micropores that are away from the liquid absorbing surface are arranged on the end surfaces of the plurality of bumps that are away from the liquid absorbing surface.

6. The heating body according to claim 5, wherein the end openings of the plurality of micropores that are away from the liquid absorbing surface are all arranged on the bottom surfaces of the plurality of first grooves; the plurality of micropores are distributed in an array, each of the plurality of first sub-grooves corresponds to one row of micropores, and each of the plurality of second sub-grooves corresponds to one column of micropores; and a plurality of rows of bumps and a plurality of rows of micropores are arranged alternately, and a plurality of columns of bumps and a plurality of columns of micropores are arranged alternately.

7. The heating body according to any one of claims 1 to 6, wherein the heating body further comprises a heating film, the heating film is arranged on the surface of the wetting structure, the heating film is configured to heat and atomize the aerosol-generation substance, the heating component (112) exposes its corresponding micropores.

8. The heating body according to any one of claims 3 to 7, wherein the heating body further comprises a heating film, the heating film comprises a first part, a second part, a third part, and a fourth part, the first part is arranged on the side wall and the bottom wall of each of the plurality of first sub-grooves, the second part is arranged on the side wall and the bottom wall of each of the plurality of second sub-grooves, the third part is arranged on an end surface of each of the plurality of bumps that is away from the liquid absorbing surface, and the fourth part extends to the pore wall of a corresponding micropore.

9. The heating body according to claim 2, wherein the

width of the first groove ranges from 1 μm to 100 μm.

10. The heating body according to claim 2, wherein the width of the first groove is less than or equal to 1.2 times of the diameter of the micropores.

11. The heating body according to claim 2, wherein the depth of the first groove ranges from 1 μm to 200 μm.

12. The heating body according to claim 11, wherein the depth of the first groove ranges from 1 μm to 50 μm.

13. The heating body according to claim 1, wherein the plurality of micropores are defined in an array the array comprises a plurality of micropore columns parallel to a first direction; and the wetting structure comprises a plurality of first sub-grooves, the extending direction of each of the plurality of first sub-grooves is parallel to the first direction, and each of the plurality of first sub-grooves at least corresponds to one column of the plurality of micropores parallel to the first direction.

14. The heating body according to claim 13, wherein the array comprises a plurality of micropore columns parallel to a second direction, the wetting structure comprises a plurality of second sub-grooves, the extending direction of each of the plurality of second sub-grooves is parallel to the second direction, and each of the plurality of second sub-grooves at least corresponds to one column of the plurality of micropores parallel to the second direction, wherein the plurality of first sub-grooves and the plurality of second sub-grooves are communicated in an intersecting manner to form a mesh structure.

15. The heating body according to claim 7, wherein the heating body further comprises a positive electrode and a negative electrode, and two ends of the heating film are electrically connected to the positive electrode and the negative electrode respectively; and the first direction is a direction approaching the negative electrode along the positive electrode.

16. The heating body according to claim 7, wherein the surface of the heating film is a lipophilic structure and surface of the heating film that is away from the dense substrate comprises a frosted structure or a sandblasting structure.

17. The heating body according to claim 7, wherein the thickness of the heating film ranges from 200 nm to 5 μm; and the material of the heating film is one or more of aluminum or aluminum alloy, copper or copper alloy, silver or silver alloy, nickel or nickel alloy, chromium or chromium alloy, platinum or platinum alloy, titanium or titanium alloy, zirconium or zirconium alloy, palladium or palladium alloy, iron or iron alloy, gold or gold alloy, molybdenum or molybdenum alloy, niobium or niobium alloy, and tantalum or tantalum alloy.

18. The heating body according to claim 7, wherein the thickness of the heating film ranges from 200 nm to 10 μm; and the material of the heating film is one or more of stainless steel, nickel-chromium-iron alloy, or nickel-based corrosion-resistant alloy.

19. The heating body according to claim 1, wherein the atomization surface is a frosted structure or a sandblasting structure to form the wetting structure.

20. The heating body according to claim 1, wherein the liquid absorbing surface is a frosted structure or a sandblasting structure.

21. The heating body according to claim 1, wherein the liquid absorbing surface comprises a second concave-convex structure, the second concave-convex structure comprises a plurality of second grooves, and the plurality of second grooves are fluidly coupled to the plurality of micropores.

22. The heating body according to claim 1, wherein the material of the dense substrate is quartz, glass, or dense ceramic, and the plurality of micropores are designed orderly.

23. The heating body according to claim 1, wherein the plurality of micropores are straight through holes, and the axis of each of the plurality of micropores is perpendicular to the dense substrate.

24. The heating body according to claim 1, further comprising a liquid guiding member, wherein the liquid guiding member and the liquid absorbing surface of the dense substrate are spaced apart to form a gap; or
the liquid guiding member is in contact with the liquid absorbing surface of the dense substrate.

25. The heating body according to claim 24, wherein the liquid guiding member is made of porous ceramic or a cotton core; or
a material of the liquid guiding member is dense, and a plurality of through holes are defined in the liquid guiding member.

26. The heating body according to claim 1, wherein a plurality of transverse holes are further defined in the dense substrate, and the plurality of transverse holes are fluidly coupled to the plurality of micropores; and the axis of each of the plurality of transverse holes intersects with the axis of each of the plurality of micropores.

27. An atomizer, comprising:

a liquid storage cavity, configured to store an aerosol-generation substance; and
a heating body, fluidly coupled to the liquid storage cavity;
wherein the heating body is the heating body according to any one of claims 1 to 26.

28. An electronic atomizing device, comprising:

the atomizer according to claim 27; and
a power supply assembly, configured to supply electric energy for operation of the atomizer.

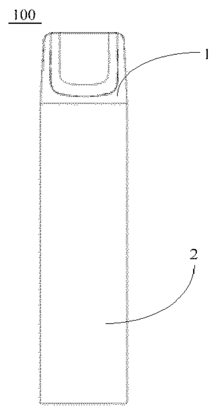

FIG. 1

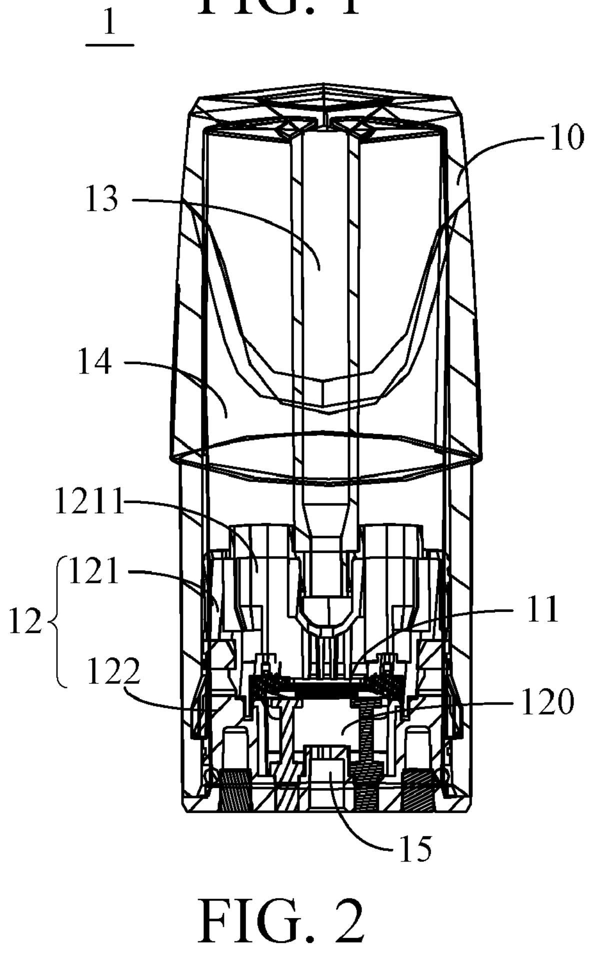

FIG. 2

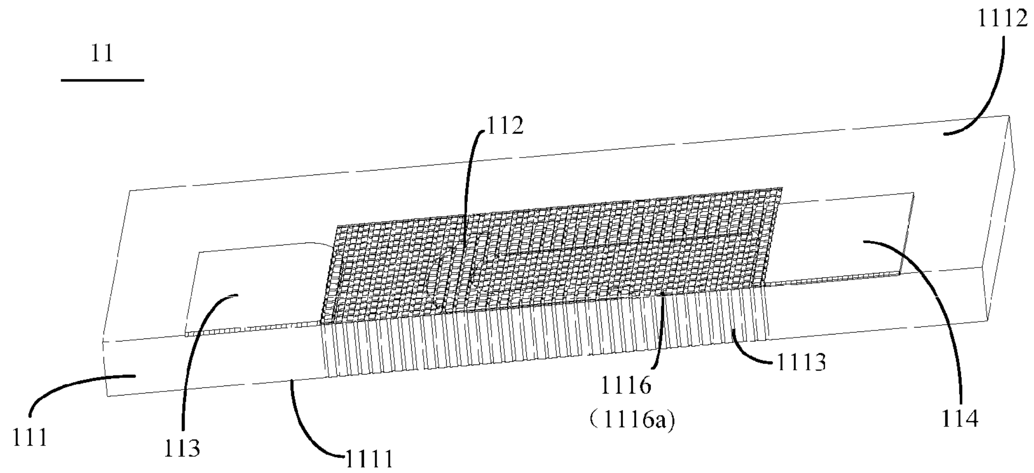

FIG. 3

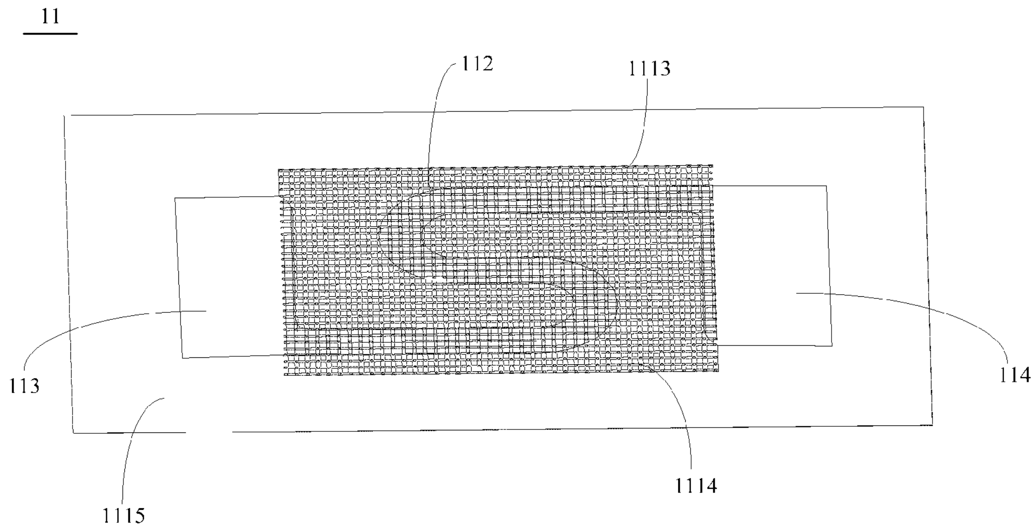

FIG. 4

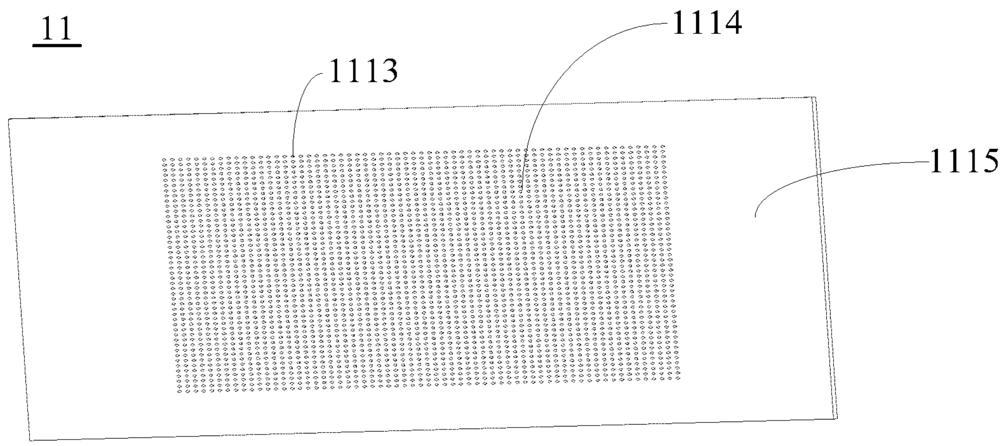

FIG. 5

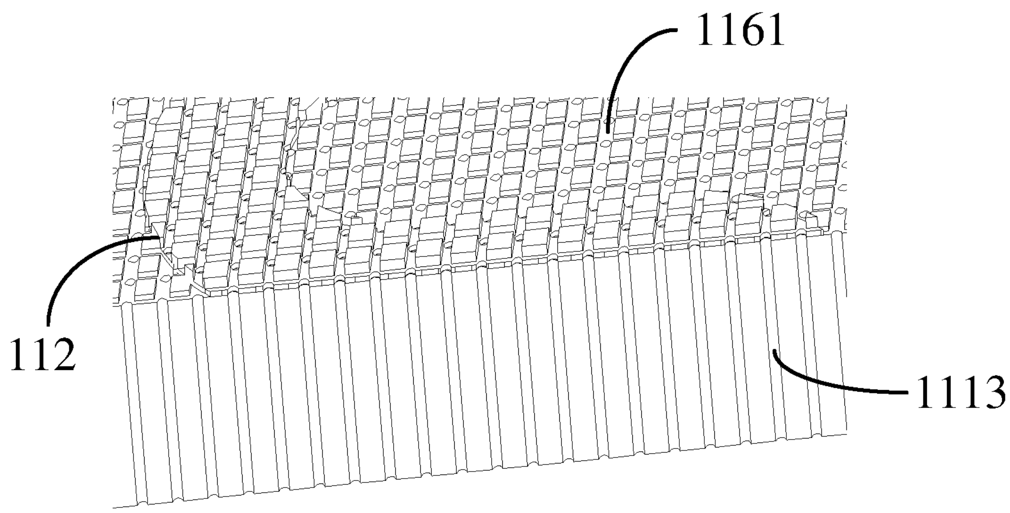

FIG. 6

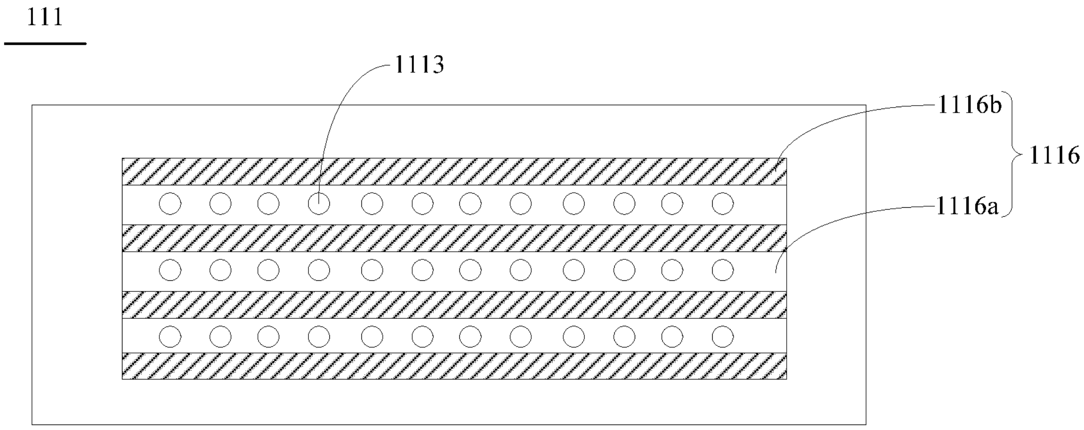

FIG. 7

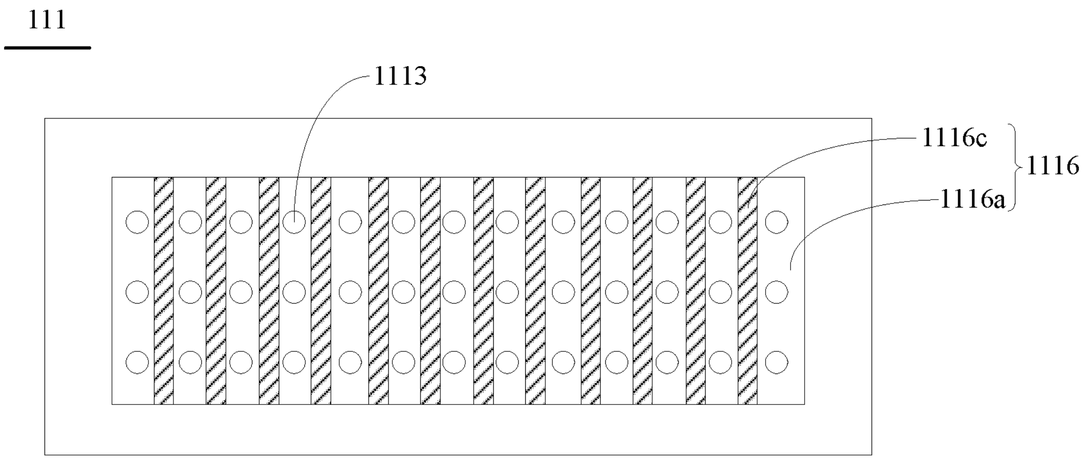

FIG. 8

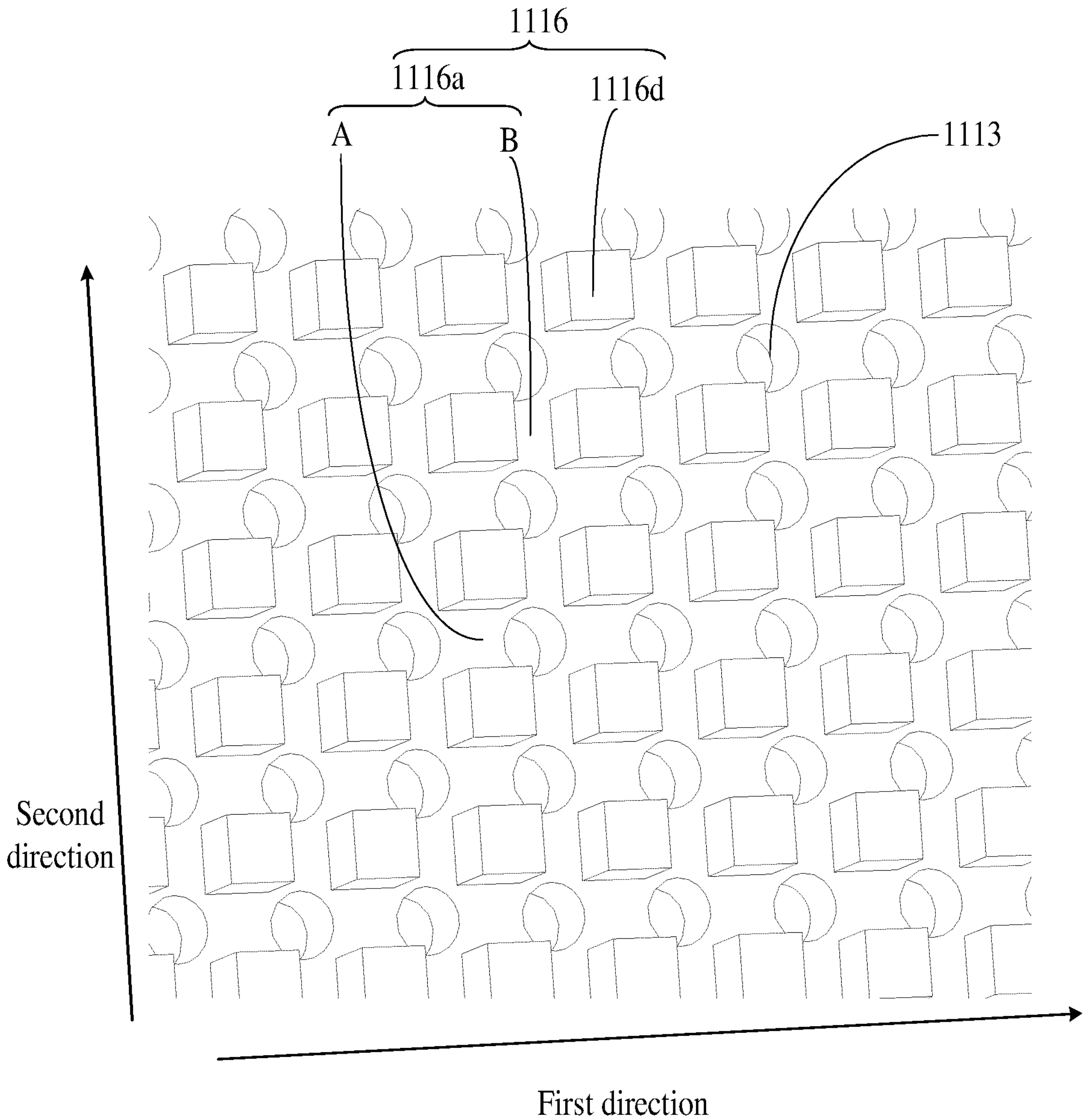

FIG. 9

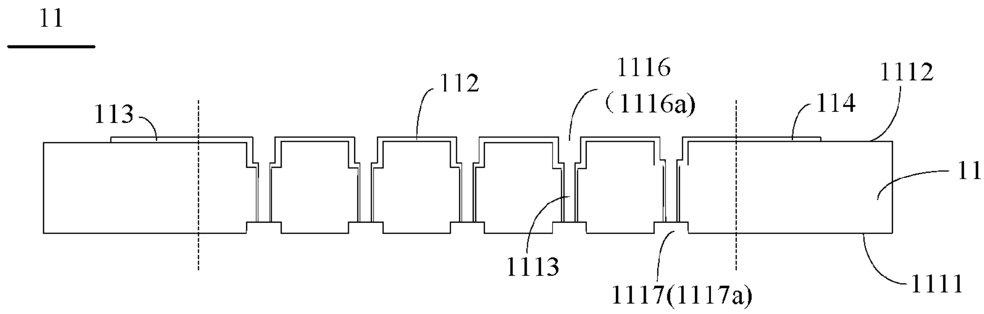

FIG. 10

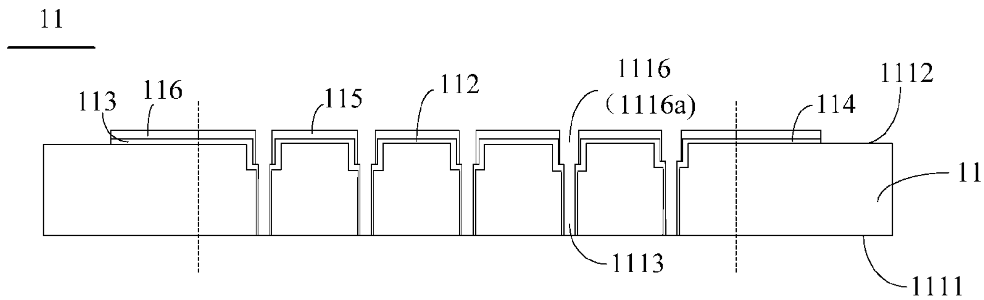

FIG. 11

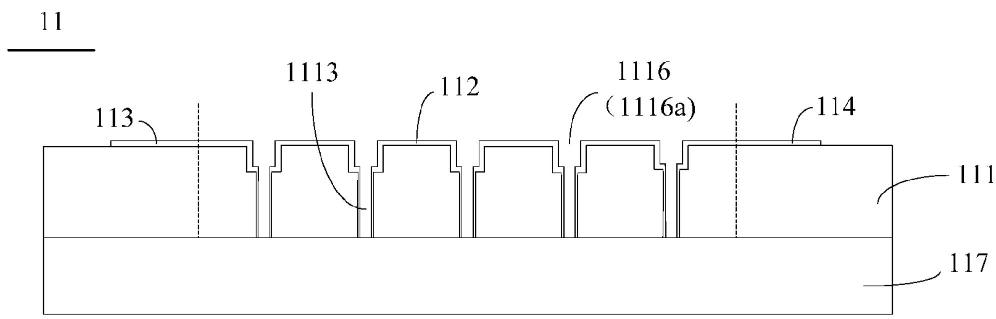

FIG. 12

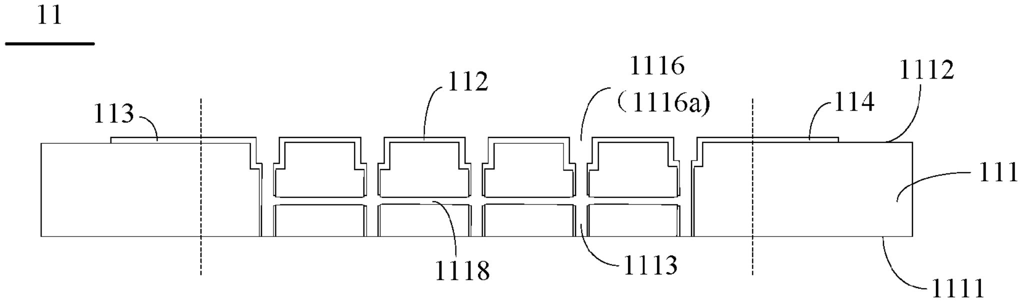

FIG. 13