Claims

1. A microfluidic paper-based chip, comprising a paper-based layer (2) that is provided with a test cell (21), which has a first contact angle region (211) and a second contact angle region (212) therein, and is arranged as follows: the contact angle of a liquid in the test cell (21) in the first contact angle region (211) is greater than the contact angle of the liquid in the second contact angle region (212).

2. The microfluidic paper-based chip of claim 1, wherein the test cell (21) is provided therein with the first contact angle region (211) that is formed from a paved, deposited or infiltrated hydrophobic material, and/or the test cell (21) is provided therein with the second contact angle region (212) that is formed from a paved, deposited or infiltrated hydrophilic material.

3. The microfluidic paper-based chip of claim 1, wherein a hydrophobic layer is formed in the test cell (21) by paving, depositing or infiltrating a hydrophobic material in the test cell (21), and the second contact angle region (212) and the first contact angle region (211) surrounding the second contact angle region (212) are formed by paving, depositing or infiltrating a hydrophilic material on top of the hydrophobic layer in a central part of the test cell (21).

4. The microfluidic paper-based chip of claim 1, wherein the second contact angle region (212) is located in the central part of the test cell (21), and the first contact angle region (211) surrounds the second contact angle region (212).

5. The microfluidic paper-based chip of claim 4, wherein the test cell (21) is formed into a circle in diameter of 2 mm to 8 mm or a regular polygon having a circumcircle in diameter of 2 mm to 8 mm, and the second contact angle region (212) is located at the center of the test cell (21), and/or the second contact angle region (212) is a circular region in diameter of 0.5 mm to 5 mm or a regular polygonal region having a circumcircle in diameter of 0.5 mm to 5 mm.

6. The microfluidic paper-based chip of claim 4, wherein the first contact angle region (211) is arranged as follows: the contact angle of the liquid in the test cell (21) increases in the first contact angle region (211) from the second contact angle region (212) to the periphery of the test cell (21).

7. The microfluidic paper-based chip of claim 1, wherein the water contact angle of the first contact angle region (211) is greater than 60 degrees, preferably greater than 90 degrees, and more preferably greater than 120 degrees.

8. The microfluidic paper-based chip of any of claims 1-7, wherein the microfluidic paper-based chip comprises a bottom layer (1) arranged on a first side of the paper-based layer (2) and a cover layer (3) arranged on a second side of the paper-based layer (2) opposite to the first side, the bottom layer (1) and the cover layer (3) have a water-impermeable and air-impermeable part covering the test cell (21), and the part of the cover layer (3) covering the test cell (21) has a vent hole (31) formed therein.

9. The microfluidic paper-based chip of claim 8, wherein the vent hole (31) is regular polygonal or circular, and has area and an aperture smaller than that of the second contact angle region (212); preferably, the diameter or circumcircle diameter of the vent hole (31) is 0.5 mm to 5 mm, preferably 1 mm to 3 mm.

10. The microfluidic paper-based chip of claim 8, wherein the position of the vent hole (301) on the cover layer (3) is align with the position of the second contact angle region (212) in the test cell (201).

11. The microfluidic paper-based chip of claim 8, wherein the paper-based layer (2) is further provided with a sample loading region (22) and a diffusion channel (23) connecting the sample loading region (22) to the test cell (21); and

the cover layer (3) is provided with a sample loading hole (32) at a position corresponding to the sample loading region (22).

12. The microfluidic paper-based chip of claim 11, wherein a chromogenic reagent is pre-arranged in the test cell (21) and/or the diffusion channel (23).

13. The microfluidic paper-based chip of claim 8, wherein the paper-based layer (2) is further provided with a liquid reservoir (24) that is arranged around the test cell (21) and used for replenishing liquid to the test cell (21).

14. A microfluidic test system, comprising the microfluidic paper-based chip of any of claims 1-13.

15. The microfluidic test system of claim 14, further comprising a regulation and control unit for controlling one or more of ambient temperature, air flow rate, humidity and vacuum degree in the area where the test cell (21) is located.

16. A liquid test method, comprising the following steps:

S1. introducing a liquid to be tested into a test cell (21) of the microfluidic paper-based chip of any of claims 1-13;

S2. keeping the microfluidic paper-based chip being stationary for a predetermined time;

S3. carrying out chromaticity identification and/or colorimetric analysis on a predetermined region in the test cell (21).

17. The liquid test method of claim 16, wherein, in step S2, the ambient temperature of the area where the test cell (21) is located is between 25℃ and 60℃.

18. The liquid test method of claim 16, wherein, in step S2, the regulation and control unit is utilized to regulate and control one or more of the ambient temperature, humidity and vacuum degree in the area where the test cell (21) is located.

19. A use of the microfluidic paper-based chip of any of claims 1-13, the microfluidic test system of claim 14 or 15 or the liquid test method of any of claims 16-18 in water quality test, environmental test, food treatment and treatment of medicines.