- The generating and depositing device comprises a unit for monitoring, by imaging, the arrangement of the droplets on the outer surface of the layer of material.

- The droplets are made up of water, an aqueous solution, oil, liquid polymer (for example silicone) or metal.

The invention also relates to a plant for surface microtexturing.

According to one particular embodiment, the microtexturing plant comprises: a system for producing an optical mask as mentioned above; a localized removal device for localized removal of the layer of material, based on the arrangement of the droplets forming the optical mask on the outer surface, which then includes removal zones and material zones forming a second mask on the substrate; and a microtexturing device for microtexturing the surface of the substrate, through the mask formed by the layer of material on the substrate.

The location of the removal depends on the arrangement of the droplets forming the optical mask. The removal is done through said optical mask.

According to other advantageous features of the microtexturing plant according to the invention, taken in isolation or in combination:

- The layer of material is made from photosensitive material and the localized removal device for the layer of material comprises, on the one hand, an exposure unit emitting a light flow that passes through the droplets and reaches the outer surface of the layer of material, and on the other hand, a unit for developing the layer of material after exposure to the light flow.

- The layer of material is made from positive photosensitive material, such that the removal zones of the layer of material are located directly below the droplets.

- The layer of material is made from negative photosensitive material, such that the removal zones of the layer of material are located around and between the droplets.

CLAIMS

1/ A system (2) for producing a mask (25) for surface microtexturing, the system (2) comprising:

- a substrate (10) having a surface (11) to be textured;
- a layer of material (20) made from photosensitive material, which covers the surface (11) of the substrate (10) and has an outer surface (21) that is exposed to the outside environment;
- a generating and depositing device (40) for generating and depositing droplets (30) on the outer surface (21) of the layer of material (20), in a specific arrangement (31) by condensation, forming an optical mask (35) on the outer surface (21) of the layer of material (20), and
- a localized removal device (50) for localized removal of the layer of material (20), based on the arrangement (31) of the droplets (30) forming the optical mask (35) on the outer surface (21) of the layer of material (20), which then includes removal zones (23) and material zones (24) forming a second mask (25) on the substrate (10),

the localized removal device (50) for the layer of material (20) comprises, on the one hand, an exposure unit (51) emitting a light flow (53) that passes through the droplets (30) and reaches the outer surface (21) of the layer of material (20), and on the other hand, a unit (54) for developing the layer of material (20) after exposure to the light flow (53),

characterized in that the exposure unit (51) comprises a light source (52) that is tilted relative to a direction normal to the outer surface (21) of the layer of material (20), and the light flow (53) passes through the droplets (30) and reaches the outer surface (21) of the layer of material (20) under oblique incidence.

2/ The system (2) according to claim 1, characterized in that the generating and depositing device (40) comprises a closed chamber (41), having a gaseous atmosphere (46) with a controlled temperature and humidity, such that the droplets

(30) condense in a controlled manner on the outer surface (21) of the layer of material (20).

3/ The system (2) according to one of the preceding claims, characterized in that the generating and depositing device (40) comprises a unit (43) for cooling a lower surface (22) of the layer of material (20).

4/ The system (2) according to one of the preceding claims, characterized in that the generating and depositing device (40) comprises a unit (30) for monitoring, by imaging, the arrangement (31) of the droplets (30) on the outer surface (21) of the layer of material (20).

5/ The system (2) according to one of claims 1 to 4, characterized in that the layer of material (20) is made from positive photosensitive material, such that the removal zones (23) of the layer of material (20) are located directly below the droplets (30).

6/ The system (2) according to one of claims 1 to 4, characterized in that the layer of material (20) is made from negative photosensitive material, such that the removal zones (23) of the layer of material (20) are located around and between the droplets (30).

7/ The system (2) according to one of the preceding claims, characterized in that the light source (52) is mounted on a hemispherical rail (55).

8/ The system (2) according to one of the preceding claims, characterized in that the exposure unit (51) comprises a platen (56) receiving the substrate (10) and rotatable to turn the layer of material (20) relative to the light flow (53).

9/ A surface treatment plant (1), comprising:

- a system (2) for producing an optical mask (25) according to one of claims 1 to 8; and
- a localized removal device (50) for localized removal of the layer of material (20), based on the arrangement (31) of the droplets (30) forming the optical mask (35) on the outer surface (21) of the layer of material (20), which then includes removal zones (23) and material zones (24) forming a second mask (25) on the substrate (10); and
- a microtexturing device (60) for microtexturing of the surface (11) of the substrate (10) through the optical mask (25) formed by the layer of material (20) on the substrate (10).

10/ A method for producing a mask (25) for surface microtexturing, characterized in that said method comprises the following steps:

- a step of providing a substrate (10) having a surface (11) to be textured;
- a step of providing a layer of material (20) which covers the surface (11) of the substrate (10) and has an outer surface (21) that is exposed to the outside environment; and
- a step of generating and depositing droplets (30) on the outer surface (21) of the layer of material (20), in a specific arrangement (31), thus forming an optical mask (35) on the outer surface (21) of the layer of material (20) and
- a step of localized removal of the layer of material (20), based on the arrangement (31) of the droplets (30) forming the optical mask (35) on the outer surface (21) of the layer of material (20), which then includes removal zones (23) and material zones (24) forming a second mask (25) on the substrate (10),

characterized in that during the step of localized removal of the layer of material (20), a light flow (53) passes through the droplets (30) and reaches the outer surface (21) of the layer of material (20) under oblique incidence..

11/ A surface treatment method, characterized in that the method comprises the following successive steps:

a) a step of providing a substrate (10) that includes a surface (11) to be textured;

b) a step of providing a layer of material (20) which covers the surface (11) of the substrate (10) and has an outer surface (21) that is exposed to the outside environment;

c) a step of generating and depositing droplets (30) on the outer surface (21) of the layer of material (20), in a specific arrangement (31) by condensation, thus forming the optical mask (35) on the outer surface (21) of the layer of material (20); and

d) a step of localized removal of the layer of material (20), based on the arrangement (31) of the droplets (30) forming the optical mask (35) on the outer surface (21) of the layer of material (20), which then includes removal zones (23) and material zones (24) forming a second mask (25) on the substrate (10); and

e) a step of microtexturing of the surface (11) of the substrate (10) through the second mask (25) formed by the layer of material (20) on the substrate (10)

characterized in that during the step of localized removal of the layer of material (20), a light flow (53) passes through the droplets (30) and reaches the outer surface (21) of the layer of material (20) under oblique incidence.

12/ The surface treatment method according to claim 10 or claim 11, characterized in that during the step of localized removal of the layer of material (20), the layer of material (20) pivots relative to the light flow (53) between two exposures, such that the layer of material (20) is exposed under different oblique incidences.