CLAIMS

1. - A hollow device for treating a biological sample (A; B); the hollow device (2) comprises an inner chamber (3), which has a volume up to 2mL; a first end (6); a first opening (5), which is arranged in the area of the first end (6), establishes a communication between the outside and the inner chamber (3) and has an area of at least 9mm^2; and a second end (7);
the hollow device (3) is characterised in that it comprises a filter (9), which is arranged in the area of the second end (7), separates the inner chamber (3) from the outside, has pores with diameters ranging from 2nm to 1µm, the diameter of all pores being at most 1µm and the diameter of a majority of the pores being at least 2 nm, an area (S) facing the inner chamber (3) up to 12.6mm^2, and a thickness being up to 500µm.

2. - The hollow device according to claim 1, wherein the filter (9) has a hold-up volume lower than 2µL and an area (S) facing the inner chamber (3) of at least 0.1mm^2.

3. - The hollow device according to claim 1 or 2, and comprising at least one wall (4), which delimits the inner chamber (3) and has a second opening (10) opposite to the first opening (5), which second opening (10) has an area from 0.2mm^2 to 13mm^2; the filter (9) having a thickness from 1µm to 250µm and covering in a substantially complete manner the second opening (10); the wall (4) having a thermal conductivity from 0.08W/mK to 0.7W/mK and a thickness up to 700µm; the inner chamber (3) having transverse sections with areas from 10mm^2 to 80mm^2; the filter (9) having pores with diameters ranging from 250nm to 600nm.

4. - The hollow device according to any one of claims 1 to 3, having a substantially tubular shape and, at least partially, the shape of a truncated cone.

5.- The hollow device of claim 4, wherein the inner chamber (3) has transverse sections that are substantially circular.

6.- A covering device suited to be externally coupled to the hollow device (2) as defined in any one of claims 1 to 5, so as to substantially obstruct said filter (9) and prevent material from passing from the inner chamber (3) to the outside through the filter (9); the covering device (11) has a cavity (12), which is provided with an open end (16), which is suited to allow the hollow device (2) to be inserted into the cavity (12), and with a closed end (17); and adjustment means (19), which are suited to change their shape, thus adjusting themselves to the shape of the hollow device (2), and the adjustment means (19) being arranged in the area of the closed end (17) and are suited to change their shape, so as to reduce the presence of air between the hollow device (2) and the covering device (11).

7. - The covering device according to claim 6, wherein the adjustment means (19) comprise a material selected within the group consisting of: elastic materials, elasto-plastic materials and liguid materials.

8. - The covering device according to claim 7, wherein the adjustment means (19) comprise a material selected within the group consisting of: silicone, natural rubbers, synthetic polymers, lubricants, oil and combinations thereof; the silicone, the rubbers and the polymers having a hardness

ranging from 10 to 80 Shore A; the oil and the lubricants having a density ranging from 0.05g/ml to 5g/ml.

9. - The covering device according to any one of claims 6 to 8, comprising at least an outer wall (14), which at least partially delimits the cavity (12) and has a thermal conductivity from 0.08W/mK to 0.7W/mK and a thickness from 40µm to 700µm.

10. - An apparatus for treating a sample (A), comprising a hollow device (2) as defined in any one of claims 1 to 5 and a covering device (11) externally coupled to the hollow device (2), so as to substantially obstruct said filter (9) and prevent material from passing from the inner chamber (3) to the outside through the filter (9); the covering device (11) has a cavity (12), which is provided with an open end (16) and a closed end (17); the hollow device (2) is at least partially arranged inside the cavity (12); the second end (7) being arranged in the area of the closed end (17).

11. - The apparatus according to claim 10, wherein the covering device (11) comprises an outer wall (14); the hollow device (2) being arranged in contact with the outer wall (14).

12. - The apparatus according to claim 10 or 11, wherein the covering device (11) is as defined in any one of claims 6 to 9.

13. - A method for treating a sample (B) comprising at least one particle (C) and a liquid component (D); the method comprises:

an insertion step, during which the sample (B) is inserted inside a hollow device (2) as defined in any one of claims 1 to 5;
a concentration step, during which a force is applied to the sample (B) inserted into the hollow body (2) towards the filter (9), so that at least part of the liquid component (D) passes through the filter (9) and the particle (C) remains in the inner chamber (3).

14. - The method according to claim 13, comprising a coupling step, which takes place after the concentration step and during which a covering device (11) is coupled to the hollow device (2), so as to substantially obstruct said filter (9) and prevent material from passing from the inner chamber (3) to the outside through the filter (9); the covering device (11) has a cavity (12), which is provided with an open end (16), through which at least part of the hollow device (2) is inserted into the cavity (12), and with a closed end (17); the second end (6) being arranged in the area of the closed end (17).

15. - The method according to claim 14, wherein the covering device (11) is as defined in any one of claims 6 to 9.

16. - The method according to any one of claims 13 to 15, comprising a genetic amplification step, which takes place after the coupling step and during which at least part of the nucleic acids of the particle (C) are amplified.

17. - A kit comprising a hollow device (2) as defined in any one of claims 1 to 5, and a covering device (11) suited to be externally coupled to the hollow device (2), so as to substantially obstruct said filter (9) and prevent material

from passing from the inner chamber (3) to the outside through the filter (9); the covering device (11) has a cavity (12), which is provided with an open end (16), through which at least part of the hollow device (2) is inserted, in use, into the cavity (12), and with a closed end (17); the cavity (12) is shaped so as to be suited to house at least part of the hollow device (2).

18. - A kit according to claim 17, wherein the covering device (11) is as defined in any one of claims 6 to 9.