CLAIMS

1. - A hollow device for treating a biological sample (A; B), in particular for separating at least a particle (C) and at least part of a liquid (D) from each other; 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 (2) 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, an area (S) facing the inner chamber (3) up to 12.6mm^2, and a thickness up to 500µm; all pores of the filter (9) have diameters up to 1µm; the majority of pores have diameters of at least 2nm; and at least one wall (4) having a thermal conductivity from 0.08W/mK to 0.7W/mK and a thickness up to 700 µm.

2. - A 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; the hold-up volume is measured as follows: an initial known volume of solution is placed in the hollow device (2); the hollow device (2) is arranged in a discharge element (22); it is centrifuged (approximately 2000rpm for two minutes) so that there is no more solution in the inner chamber (3); the volume of liquid collected is measured and the volume measured is subtracted from the initial volume.

3. - A hollow device according to claim 1 wherein the 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 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; the thermal conductivity is measured according to common technical standards and, in particular, it is measured accordingly to the methodology established by ISO 22007 : 2012.

4. - A hollow device according to one of the previous claims; the hollow device (2) has a substantially tubular shape and, at least partially, the shape of a truncated cone; in particular, the inner chamber (3) has transverse sections that are substantially circular.

5.- A covering device suited to be externally coupled to the hollow device (2) according to one of the previous claims, 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);
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 and a viscosity ranging from 1 mPa s to 10000 Pa s.

6.- A covering device according to claim 5, wherein the cavity (12) is shaped so as to be suited to house at least part of the hollow device (2); the adjustment means (19) are 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.- A covering device according to claim 5 or 6, wherein the adjustment means (19) comprise a material selected within the group consisting of: elastic materials, elasto-plastic materials and liquid materials.

8.- A covering device according to one of the claims from 5 to 7, 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.

9.- An apparatus for treating a sample (A), in particular for PCR, comprising a hollow device (2) according to one of the claims from 1 to 4 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).

10.- An apparatus according to claim 9, wherein the covering device (11) comprises an outer wall (14); the hollow device (2) being arranged in contact with the outer wall (14).

11.- An apparatus according to claim 9 or 10, wherein the covering device (11) is as claimed in one of the claims from 5 to 8.

12.- 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) according to one of the claims from 1 to 4;
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).

13.- A method according to claim 14 and 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).

14.- A method according to claim 13, wherein the covering device (11) is as claimed in one of claims from 5 to 8.

15.- A method according to one of the claims from 12 to 14 and 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.

16.- A kit comprising a hollow device (2) according to one of the claims from 1 to 4, 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).

17.- A kit according to claim 16, wherein the covering device (11) is as claimed in one of claims from 5 to 8.