WHAT IS CLAIMED IS:

1. An electrochemical measurement device comprising a plurality of working electrodes, each of the plurality of working electrodes including an electrode surface supplying or receiving electrons to or from a chemical substance generated or consumed in a biological sample in a solution to cause an oxidation-reduction reaction, the biological sample having a diameter not less than 100 μm and not more than 600 μm, the diameter of the biological sample being defined as a diameter of a smallest sphere which encompasses the biological sample, wherein

all of the electrode surfaces have diameter dimensions d_{el} not more than 80 μm and are arrayed on one flat surface,

a spacer is provided in a solution well containing the solution and the biological sample, the spacer having a profile surface at a distance h_1 in a direction perpendicular to the one flat surface, the distance h_1 satisfying

$h_1 = 21.8(d_{el}+0.8)/(d_{el}+9.7)\pm5$ [μm],

the spacer inhibiting the biological sample from entering a region on a side with the one flat surface of the profile surface and allowing a dissolved substance in the solution to diffuse, and

a wall plate is provided between the two electrode surfaces adjacent to each other, the wall plate extending to cross a line connecting centers of the two electrode surfaces, having a height not less than a height of the spacer from the one flat surface, and being impervious to the dissolved substance in the solution.

2. An electrochemical measurement device comprising a plurality of

working electrodes, each of the plurality of working electrodes including an electrode surface supplying or receiving electrons to or from a chemical substance generated or consumed in a biological sample in a solution to cause an oxidation-reduction reaction, the biological sample having a diameter not less than 100 μm and not more than 600 μm, the diameter of the biological sample being defined as a diameter of a smallest sphere which encompasses the biological sample, wherein

all of the electrode surfaces have diameter dimensions d_{el} not more than 80 μm and are arrayed on one flat surface,

a spacer is provided in a solution well containing the solution and the biological sample, the spacer having an inverse-cone-shaped profile surface at a distance h_2 in a direction perpendicular to the one flat surface, the distance h_2 being dependent on a distance m in any direction parallel to the one flat surface from a center of the closest electrode surface and satisfying

$$h_2 = \sqrt{\{(1.05d_{el}+6.89)m\}}-0.48d_{el}-2.38\pm5\ [\mu m],$$

the spacer inhibiting the biological sample from entering a region on a side with the one flat surface of the profile surface and allowing a dissolved substance in the solution to diffuse, and

a wall plate is provided between the two electrode surfaces adjacent to each other, the wall plate extending to cross a line connecting centers of the two electrode surfaces, having a height not less than a maximum height of the spacer from the one flat surface, and being impervious to the dissolved substance in the solution.

3. The electrochemical measurement device according to Claim 1 or 2, wherein

the electrode surfaces are arrayed in a configuration in which a plurality of electrode rows are arranged in a second direction orthogonal to a first direction, each of the plurality of electrode rows having the plurality of the electrode surfaces which are arranged in a straight line in the first direction, and

the wall plate is provided to extend in the first direction between the electrode rows adjacent to each other.

4. The electrochemical measurement device according to any one of Claims 1 to 3, wherein

the spacer is composed of a group of pillar structures which extend in the direction perpendicular to the one flat surface and stand at intervals less than 100 μm.

5. The electrochemical measurement device according to any one of Claims 1 to 3, wherein

the spacer is composed of a porous structure having a pore diameter less than 100 μm.

6. An electrochemical measurement device comprising a plurality of working electrodes, each of the plurality of working electrodes including an electrode surface supplying or receiving electrons to or from a chemical substance generated or consumed in a biological sample in a solution to

cause an oxidation-reduction reaction, the biological sample having a diameter not less than 100 μm and not more than 600 μm, the diameter of the biological sample being defined as a diameter of a smallest sphere which encompasses the biological sample, wherein

all of the electrode surfaces have diameter dimensions d_{el} not more than 80 μm and are arrayed on one flat surface, on which x-y orthogonal coordinates are defined, such that x coordinates of centers of the at least two electrode surfaces are different from each other, and

a plurality of wall plates are provided to be arrayed at intervals less than 100 μm in an x direction on the one flat surface where the electrode surfaces are arrayed, each of the plurality of wall plates extending in a y direction, having a height h_3 satisfying

$h_3 = 21.8(d_{el}+0.8)/(d_{el}+9.7)\pm5$ [μm],

and being impervious to a dissolved substance in the solution.

7. The electrochemical measurement device according to Claim 6, wherein

the height h_3 of at least one of two of the wall plates, distances in the x direction of which from a center of one of the electrode surfaces are smallest and second smallest, changes along the y direction so as to be minimal at a y coordinate equal to a y coordinate of the center of the electrode surface.

8. The electrochemical measurement device according to Claim 6, wherein

the heights h_3 of two of the wall plates which extend on two outer sides of one of the electrode surfaces and are parallel to each other without a different one of the wall plates sandwiched between the two wall plates change along the y direction so as to be minimal at y coordinates equal to a y coordinate of a center of the electrode surface.

9. The electrochemical measurement device according to Claim 6, wherein

an x coordinate of at least one of two of the wall plates, distances in the x direction of which from a center of one of the electrode surfaces are smallest and second smallest, changes locally along the y direction such that the distance in the x direction from the center of the electrode surface is maximal at a y coordinate equal to a y coordinate of the center of the electrode surface.

10. The electrochemical measurement device according to Claim 6, wherein

an x coordinate of a first wall plate which is one of the wall plates, a distance in the x direction of which from a center of one of the electrode surfaces is smallest, changes locally along the y direction such that the distance in the x direction from the center of the electrode surface is maximal at a y coordinate equal to a y coordinate of the center of the electrode surface, and an x coordinate of a second wall plate which is a different one of the wall plates which is adjacent to the first wall plate across the center of the electrode surface changes locally along the y

direction such that a distance in the x direction from the center of the electrode surface is maximal at a y coordinate equal to the y coordinate of the center of the electrode surface.

11. The electrochemical measurement device according to any one of Claims 6 to 10, wherein

a tall wall plate is further provided between at least one combination of two x-direction adjacent electrode surfaces, each of the at least one combination of the two x-direction adjacent electrode surfaces being a combination of two of the electrode surfaces, x coordinates of centers of the two electrode surfaces being different from each other, a different one of the electrode surfaces which has an x coordinate intermediate between the x coordinates being not present, the tall wall plate extending in the y direction to cross a line segment connecting centers of the two electrode surfaces over a whole of a width of the tall wall plate, having a height more than the heights of the wall plates, and being impervious to the dissolved substance in the solution.

12. An electrochemical measurement device comprising a plurality of working electrodes, each of the plurality of working electrodes including an electrode surface supplying or receiving electrons to or from a chemical substance generated or consumed in a biological sample in a solution to cause an oxidation-reduction reaction, the biological sample having a diameter not less than 100 μm and not more than 600 μm, the diameter of the biological sample being defined as a diameter of a smallest sphere

which encompasses the biological sample, wherein

all of the electrode surfaces have diameter dimensions d_{el} not more than 80 μm and are arrayed on one flat surface, on which x-y orthogonal coordinates are defined, in a configuration in which a plurality of electrode rows are arranged in an x direction, each of the plurality of electrode rows having one or more of the electrode surfaces which are arranged in a y direction such that x coordinates of centers of all of the one or more electrode surfaces match up, and

a plurality of wall plates are provided to be arrayed at intervals less than 100 μm in the x direction on the one flat surface where the electrode surfaces are arrayed, the plurality of wall plates extending in the y direction, having heights h_4, and being impervious to a dissolved substance in the solution, the heights h_4 being dependent on a distance m in the x direction from a center of one of the electrode surfaces which belongs to the electrode row that is closest in the x direction and satisfying

$h_4 = \sqrt{\{(1.05d_{el}+6.89)m\}}-0.48d_{el}-2.38\pm5$ [μm]

and changing gradually.

13. The electrochemical measurement device according to Claim 12, wherein

the height h_4 of at least one of one or more of the wall plates which each extend to cross a line segment connecting a first end point and a second end point over a whole or part of a width of the wall plate changes along the y direction so as to be minimal at a y coordinate equal to a y coordinate of a center of one of the electrode surfaces, the first end point

being not a relatively farther one of a point 300 μm away in one direction of the x direction from the center of the electrode surface and a point at a distance which is one-half of a distance to an x coordinate of a center of the electrode surface which belongs to the electrode row that is adjacent in the one direction, the second end point being not a relatively farther one of a point 300 μm away in the other direction of the x direction from the center of the electrode surface and a point at a distance which is one-half of a distance to an x coordinate of a center of the electrode surface which belongs to the electrode row that is adjacent in the other direction.

14. The electrochemical measurement device according to Claim 13, wherein

the heights h_4 of all of one or more of the wall plates which each extend to cross the line segment over the whole of the widths of the wall plates change along the y direction so as to be minimal at y coordinates equal to the y coordinate of the center of the electrode surface.

15. The electrochemical measurement device according to any one of Claims 12 to 14, wherein

a tall wall plate is further provided between at least one combination of the electrode rows which are adjacent to each other in the x direction, the tall wall plate extending in the y direction at an x coordinate intermediate between x coordinates of centers of the electrode surfaces which belong to the two electrode rows, having a height more than a maximum height of the wall plates, and being impervious to the dissolved

substance in the solution.

16. A transducer in which a solution well capable of containing a solution and a biological sample immersed in the solution is mounted on a large-scale integrated chip, and a plurality of working electrodes that each include an electrode surface supplying or receiving electrons to or from a chemical substance generated or consumed in the biological sample in the solution to cause an oxidation-reduction reaction are provided on the large-scale integrated chip, the biological sample having a diameter not less than 100 μm and not more than 600 μm, the diameter of the biological sample being defined as a diameter of a smallest sphere which encompasses the biological sample, wherein

all of the electrode surfaces have diameter dimensions d_{el} not more than 80 μm and are arrayed on one flat surface,

a spacer is provided in the solution well, the spacer having a profile surface at a distance h_1 in a direction perpendicular to the one flat surface, the distance h_1 satisfying

$h_1 = 21.8(d_{el}+0.8)/(d_{el}+9.7)\pm5$ [μm],

the spacer inhibiting the biological sample from entering a region on a side with the one flat surface of the profile surface and allowing a dissolved substance in the solution to diffuse, and

a wall plate is provided between the two electrode surfaces adjacent to each other, the wall plate extending to cross a line connecting centers of the two electrode surfaces, having a height not less than a height of the spacer from the one flat surface, and being impervious to the dissolved

substance in the solution.

17. A transducer in which a solution well capable of containing a solution and a biological sample immersed in the solution is mounted on a large-scale integrated chip, and a plurality of working electrodes that each include an electrode surface supplying or receiving electrons to or from a chemical substance generated or consumed in the biological sample in the solution to cause an oxidation-reduction reaction are provided on the large-scale integrated chip, the biological sample having a diameter not less than 100 μm and not more than 600 μm, the diameter of the biological sample being defined as a diameter of a smallest sphere which encompasses the biological sample, wherein

all of the electrode surfaces have diameter dimensions d_{el} not more than 80 μm and are arrayed on one flat surface,

a spacer is provided in the solution well, the spacer having an inverse-cone-shaped profile surface at a distance h_2 in a direction perpendicular to the one flat surface, the distance h_2 being dependent on a distance m in any direction parallel to the one flat surface from a center of the closest electrode surface and satisfying

$h_2 = \sqrt{\{(1.05d_{el}+6.89)m\}}-0.48d_{el}-2.38\pm5$ [μm],

the spacer inhibiting the biological sample from entering a region on a side with the one flat surface of the profile surface and allowing a dissolved substance in the solution to diffuse, and

a wall plate is provided between the two electrode surfaces adjacent to each other, the wall plate extending to cross a line connecting centers of

the two electrode surfaces, having a height not less than a maximum height of the spacer from the one flat surface, and being impervious to the dissolved substance in the solution.

18. The transducer according to Claim 16 or 17, wherein

the electrode surfaces are arrayed in a configuration in which a plurality of electrode rows are arranged in a second direction orthogonal to a first direction, each of the plurality of electrode rows having the plurality of the electrode surfaces which are arranged in a straight line in the first direction, and

the wall plate is provided to extend in the first direction between the electrode rows adjacent to each other.

19. The transducer according to any one of Claims 16 to 18, wherein

the spacer is composed of a group of pillar structures which extend in the direction perpendicular to the one flat surface and stand at intervals less than 100 μm.

20. The transducer according to any one of Claims 16 to 18, wherein

the spacer is composed of a porous structure having a pore diameter less than 100 μm.

21. A transducer in which a solution well capable of containing a solution and a biological sample immersed in the solution is mounted on a large-scale integrated chip, and a plurality of working electrodes that each

include an electrode surface supplying or receiving electrons to or from a chemical substance generated or consumed in the biological sample in the solution to cause an oxidation-reduction reaction are provided on the large-scale integrated chip, the biological sample having a diameter not less than 100 μm and not more than 600 μm, the diameter of the biological sample being defined as a diameter of a smallest sphere which encompasses the biological sample, wherein

all of the electrode surfaces have diameter dimensions d_{el} not more than 80 μm and are arrayed on one flat surface, on which x-y orthogonal coordinates are defined, such that x coordinates of centers of at least two of the electrode surfaces are different from each other, and

a plurality of wall plates are provided to be arrayed at intervals less than 100 μm in an x direction on the one flat surface where the electrode surfaces are arrayed, each of the plurality of wall plates extending in a y direction, having a height h_3 satisfying

$h_3 = 21.8(d_{el}+0.8)/(d_{el}+9.7)\pm5$ [μm],

and being impervious to a dissolved substance in the solution.

22. The transducer according to Claim 21, wherein

the height h_3 of at least one of two of the wall plates, distances in the x direction of which from a center of one of the electrode surfaces are smallest and second smallest, changes along the y direction so as to be minimal at a y coordinate equal to a y coordinate of the center of the electrode surface.

23. The transducer according to Claim 21, wherein

the heights h_3 of two of the wall plates which extend on two outer sides of one of the electrode surfaces and are parallel to each other without a different one of the wall plates sandwiched between the two wall plates change along the y direction so as to be minimal at y coordinates equal to a y coordinate of a center of the electrode surface.

24. The transducer according to Claim 21, wherein

an x coordinate of at least one of two of the wall plates, distances in the x direction of which from a center of one of the electrode surfaces are smallest and second smallest, changes locally along the y direction such that the distance in the x direction from the center of the electrode surface is maximal at a y coordinate equal to a y coordinate of the center of the electrode surface.

25. The transducer according to Claim 21, wherein

an x coordinate of a first wall plate which is one of the wall plates, a distance in the x direction of which from a center of one of the electrode surfaces is smallest, changes locally along the y direction such that the distance in the x direction from the center of the electrode surface is maximal at a y coordinate equal to a y coordinate of the center of the electrode surface, and an x coordinate of a second wall plate which is a different one of the wall plates which is adjacent to the first wall plate across the center of the electrode surface changes locally along the y direction such that a distance in the x direction from the center of the

electrode surface is maximal at a y coordinate equal to the y coordinate of the center of the electrode surface.

26. The transducer according to any one of Claims 21 to 25, wherein a tall wall plate is further provided between at least one combination of two x-direction adjacent electrode surfaces, each of the at least one combination of the two x-direction adjacent electrode surfaces being a combination of two of the electrode surfaces, x coordinates of centers of the two electrode surfaces being different from each other, a different one of the electrode surfaces which has an x coordinate intermediate between the x coordinates being not present, the tall wall plate extending in the y direction to cross a line segment connecting centers of the two electrode surfaces over a whole of a width of the tall wall plate, having a height more than the heights of the wall plates, and being impervious to the dissolved substance in the solution.

27. A transducer in which a solution well capable of containing a solution and a biological sample immersed in the solution is mounted on a large-scale integrated chip, and a plurality of working electrodes that each include an electrode surface supplying or receiving electrons to or from a chemical substance generated or consumed in the biological sample in the solution to cause an oxidation-reduction reaction are provided on the large-scale integrated chip, the biological sample having a diameter not less than 100 μm and not more than 600 μm, the diameter of the biological sample being defined as a diameter of a smallest sphere which encompasses the

biological sample, wherein

all of the electrode surfaces have diameter dimensions d_{el} not more than 80 μm and are arrayed on one flat surface, on which x-y orthogonal coordinates are defined, in a configuration in which a plurality of electrode rows are arranged in an x direction, each of the plurality of electrode rows having one or more of the electrode surfaces which are arranged in a y direction such that x coordinates of centers of all of the one or more electrode surfaces match up, and

a plurality of wall plates are provided to be arrayed at intervals less than 100 μm in the x direction on the one flat surface where the electrode surfaces are arrayed, the plurality of wall plates extending in the y direction, having heights h_4, and being impervious to a dissolved substance in the solution, the heights h_4 being dependent on a distance m in the x direction from a center of one of the electrode surfaces which belongs to the electrode row that is closest in the x direction and satisfying

$h_4 = \sqrt{\{(1.05d_{el}+6.89)m\}}-0.48d_{el}-2.38\pm5$ [μm]

and changing gradually.

28. The transducer according to Claim 27, wherein

the height h_4 of at least one of one or more of the wall plates which each extend to cross a line segment connecting a first end point and a second end point over a whole or part of a width of the wall plate changes along the y direction so as to be minimal at a y coordinate equal to a y coordinate of a center of one of the electrode surfaces, the first end point being not a relatively farther one of a point 300 μm away in one direction

of the x direction from the center of the electrode surface and a point at a distance which is one-half of a distance to an x coordinate of a center of the electrode surface which belongs to the electrode row that is adjacent in the one direction, the second end point being not a relatively farther one of a point 300 μm away in the other direction of the x direction from the center of the electrode surface and a point at a distance which is one-half of a distance to an x coordinate of a center of the electrode surface which belongs to the electrode row that is adjacent in the other direction.

29. The transducer according to Claim 28, wherein

the heights h_4 of all of one or more of the wall plates which each extend to cross the line segment over the whole of the widths of the wall plates change along the y direction so as to be minimal at y coordinates equal to the y coordinate of the center of the electrode surface.

30. The transducer according to any one of Claims 27 to 29, wherein

a tall wall plate is further provided between at least one combination of the electrode rows which are adjacent to each other in the x direction, the tall wall plate extending in the y direction at an x coordinate intermediate between x coordinates of centers of the electrode surfaces which belong to the two electrode rows, having a height more than a maximum height of the wall plates, and being impervious to the dissolved substance in the solution.