Claims

1.Microcrystalline glass product, comprising the following components by weight percentage: SiO_2：65～80%；Al_2O_3：below 5%；Li_2O：10～25%；ZrO_2：5～15%；P_2O_5：1～5%; and wherein $Al_2O_3/(Li_2O+ZrO_2+P_2O_5)$ is 0.15-0.3 and $(Li_2O+Al_2O_3)/ZrO_2$ is 1.5-2.5.

2.Microcrystalline glass product, comprising the following components by weight percentage: SiO_2：65～80%；Al_2O_3：below 10%；Li_2O：8～25%；ZrO_2：5～15%；P_2O_5：1～5%; and wherein $Al_2O_3/(Li_2O+ZrO_2+P_2O_5)$ is 0.15-0.3 and $(Li_2O+Al_2O_3)/ZrO_2$ is 1.5-2.5.

3.The microcrystalline glass product according to claim 1 or 2, further comprising the following components by weight percentage: K_2O：0～5%；and/or MgO：0～3%；and/or ZnO：0～3%；and/or Na_2O：0～6%；and/or SrO：0～5%；and/or BaO：0～5%；and/or CaO：0～5%；and/or TiO_2：0～5%；and/or B_2O_3：0～5%；and/or Y_2O_3：0～6%；and/or fining agent：0～2%.

4.The microcrystalline glass product according to claim 1 or 2, wherein the components are expressed in weight percentage, satisfying one or more of the following 8 situations:

1)Al_2O_3/（$P_2O_5+ZrO_2$）is below 1.2，preferably Al_2O_3/（$P_2O_5+ZrO_2$）is 0.05～0.7;

2) SiO_2/ZrO_2 is 6.0～9.0;

3)$P_2O_5+ZrO_2$：6～21%，preferably $P_2O_5+ZrO_2$：10～16%;

4)（ZrO_2+Li_2O）/Al_2O_3 is above 2.0，preferably（ZrO_2+Li_2O）/Al_2O_3 is 2.5～30.0;

5)（$SiO_2+Al_2O_3$）/ZrO_2 is 4.0～16.0，preferably（$SiO_2+Al_2O_3$）/ZrO_2 is 6.0～9.5；

6)（Li_2O+ZrO_2）/SiO_2 is 0.19～0.55，preferably（Li_2O+ZrO_2）/SiO_2 is 0.25～0.45;

7)（MgO+ZnO）/ZrO_2 is below 0.65，preferably（MgO+ZnO）/ZrO_2 is below 0.1;

8)

Li_2O/（$ZrO_2+P_2O_5$）is 0.5～3.0，preferably Li_2O/（$ZrO_2+P_2O_5$）is 0.8～1.5.

5.The microcrystalline glass product according to claim 1 or 2, wherein the components are expressed in weight percentage: Al_2O_3/（$Li_2O+ZrO_2+P_2O_5$）is 0.15～0.2；and/or Al_2O_3/Li_2O is below 0.4，preferably Al_2O_3/Li_2O is below 0.2.

6.The microcrystalline glass product according to claim 1 or 2, comprising the following components by weight percentage: SiO_2：70～76%；and/or Al_2O_3：0.1～4.5%；and/or Li_2O：12.5～20%；and/or ZrO_2：7～12%；and/or P_2O_5：2～5%；and/or K_2O：0～4%；and/or MgO：0～2%；and/or ZnO：0～2%；and/or Na_2O：0～4%；and/or SrO：0～2%；and/or BaO：0～2%；and/or CaO：0～2%；and/or TiO_2：0～2%；and/or B_2O_3：0～3%；and/or Y_2O_3：0～4%；and/or fining agent：0～1%.

7.The microcrystalline glass product according to claim 2, wherein the components are expressed in weight percentage: Al_2O_3/（$Li_2O+ZrO_2+P_2O_5$）is below 0.25；and/or Al_2O_3/Li_2O

is below 0.7，preferably Al_2O_3/Li_2O is below 0.45；and/or Al_2O_3/（P_2O_5+ZrO_2）is 0.1～0.6；and/or（ZrO_2+Li_2O）/Al_2O_3 is 3.0～20.0.

8.The microcrystalline glass product according to claim 2, comprising the following components by weight percentage: SiO_2：60～76%；and/or Al_2O_3：0.5～7%；and/or Li_2O：10～20%；and/or ZrO_2：7～12%；and/or P_2O_5：2～5%；and/or K_2O：0～4%；and/or MgO：0～2%；and/or ZnO：0～2%；and/or Na_2O：0～4%；and/or SrO：0～2%；and/or BaO：0～2%；and/or CaO：0～2%；and/or TiO_2：0～2%；and/or B_2O_3：0～3%；and/or Y_2O_3：0～4%；and/or fining agent：0～1%

9.The microcrystalline glass product according to claim 1 or 2, further comprising the following components by weight percentage: La_2O_3+Gd_2O_3+Yb_2O_3+Nb_2O_5+WO_3+Bi_2O_3+Ta_2O_5+TeO_2+GeO_2：0～5%；and/or NiO：0～4%；and/or Ni_2O_3：0～4%；and/or CoO：0～2%；and/or Co_2O_3：0～2%；and/or Fe_2O_3：0～7%；and/or MnO_2：0～4%；and/or Er_2O_3：0～8%；and/or Nd_2O_3：0～8%；and/or Cu_2O：0～4%；and/or Pr_2O_3：0～8%；and/or CeO_2：0～4%；and/or do not contain SrO；and/or do not contain BaO；and/or do not contain MgO；and/or do not contain CaO；and/or do not contain ZnO；and/or do not contain PbO；and/or do not contain As_2O_3；and/or do not contain TiO_2；and/or do not contain B_2O_3；and/or do not contain Y_2O_3；and/or do not contain F.

10.The microcrystalline glass product according to claim 1 or 2, characterized in that the crystalline phase of the microcrystalline glass product contains a lithium silicate crystalline phase, and the lithium silicate crystalline phase has a higher weight percentage than other crystalline phases, and the lithium silicate crystalline phase accounts for 10 ～ 70% by weight of the microcrystalline glass product, and preferably the lithium silicate crystalline phase accounts for 20 ～ 55% by weight of the microcrystalline glass product.

11.The microcrystalline glass product according to claim 1 or 2, characterized in that the crystalline phase of the microcrystalline glass product contains a lithium monosilicate crystalline phase, a lithium monosilicate crystalline phase having a higher weight percentage than other crystalline phases, a lithium monosilicate crystalline phase accounting for 30-65% by weight of the microcrystalline glass product, preferably a lithium monosilicate crystalline phase accounting for 40～55% by weight of the microcrystalline glass product.

12.The microcrystalline glass product according to claim 1 or 2, characterized in that the crystalline phase of the microcrystalline glass product contains a lithium disilicate crystalline phase, the lithium disilicate crystalline phase has a higher weight percentage than other crystalline phases, the lithium disilicate crystalline phase accounts for 10-60% by weight of the microcrystalline glass product, preferably the lithium disilicate crystalline phase accounts for 20-45% by weight of the microcrystalline glass product.

13.The microcrystalline glass product according to claim 1 or 2, characterized in that the

microcrystalline glass product contains lithium phosphate crystalline phase, and the lithium phosphate crystalline phase represents less than 5% by weight of the microcrystalline glass product; and/or the microcrystalline glass product contains quartz solid solution crystalline phase, and the quartz solid solution crystalline phase represents less than 5% by weight of the microcrystalline glass product; and/or the microcrystalline glass product contains petalite crystalline phase, and the petalite crystalline phase represents less than 5% by weight of the microcrystalline glass product.

14.The microcrystalline glass product according to claim 1 or 2, characterized in that the microcrystalline glass product has a four-point bending strength of 600 MPa or more, preferably 700 MPa or more; and/or an ion exchange layer depth of 20μm or more, preferably 40μm or more; and/or a drop ball test height of 1400 mm or more, preferably 1600 mm or more; and/or a fracture toughness of 1MPa-$m^{1/2}$ or more, preferably 1.5MPa-$m^{1/2}$ or more; and/or Vickers hardness of 730kgf/mm^2 or more, preferably 780kgf/mm^2 or more; and/or dielectric constant ε_r of 5.4 or more, preferably 6.0 or more; and/or dielectric loss tanδ of 0.05 or less, preferably 0.01 or less; and/or crystallinity of 50% or above, preferably above 70%; and/or the grain size is below 80 nm, preferably below 30 nm; and/or the haze of microcrystalline glass products of thickness below 1 mm is below 0.2%, preferably below 0.15%; and/or the average light transmission rate of microcrystalline glass products of thickness below 1 mm from 400～ 800 nm is above 87%, preferably above 90%; and/or the light transmittance of 550 nm wavelength of microcrystalline glass products of less than 1 mm thickness is 88% or more, preferably 91% or more; and/or the average light |B| value of 400 ～ 800 nm of microcrystalline glass products of less than 1 mm thickness is below 0.9, preferably below 0.7.

15.Microcrystalline glass, comprising the following components by weight percentage: SiO_2：65～80%；Al_2O_3：below 5%；Li_2O：10～25%；ZrO_2：5～15%；P_2O_5：1～5%; and wherein $Al_2O_3/(Li_2O+ZrO_2+P_2O_5)$ is 0.15-0.3 and $(Li_2O+Al_2O_3)/ZrO_2$ is 1.5-2.5.

16.Microcrystalline glass, comprising the following components by weight percentage: SiO_2：65～80%；Al_2O_3：below 10%；Li_2O：8～25%；ZrO_2：5～15%；P_2O_5：1～5%; and wherein $Al_2O_3/(Li_2O+ZrO_2+P_2O_5)$ is 0.15-0.3 and $(Li_2O+Al_2O_3)/ZrO_2$ is 1.5-2.5.

17.The microcrystalline glass according to claim 15 or 16, further comprising the following components by weight percentage：K_2O：0～5%；and/or MgO：0～3%；and/or ZnO：0～3%；and/or Na_2O：0～6%；and/or SrO：0～5%；and/or BaO：0～5%；and/or CaO：0～5%；and/or TiO_2：0～5%；and/or B_2O_3：0～5%；and/or Y_2O_3：0～6%；and/or fining agent：0～2%.

18.The microcrystalline glass according to claim 15 or 16, wherein the components are expressed in weight percentage , satisfying one or more of the following 8 situations:

1) Al_2O_3/（P_2O_5+ZrO_2）is below 1.2，preferably Al_2O_3/（P_2O_5+ZrO_2）is 0.05～0.7;

2) SiO_2/ZrO_2 is 6.0～9.0；

3）$P_2O_5+ZrO_2$：6～21%，preferably $P_2O_5+ZrO_2$：10～16%；

4)（ZrO_2+Li_2O）/Al_2O_3 is above 2.0，preferably（ZrO_2+Li_2O）/Al_2O_3 is 2.5～30.0；

5)（$SiO_2+Al_2O_3$）/ZrO_2 is 4.0～16.0，preferably（$SiO_2+Al_2O_3$）/ZrO_2 is 6.0～9.5；

6)（Li_2O+ZrO_2）/SiO_2 is 0.19～0.55，preferably（Li_2O+ZrO_2）/SiO_2 is 0.25～0.45；

7)（MgO+ZnO）/ZrO_2 is below 0.65，preferably（MgO+ZnO）/ZrO_2 is below 0.1；

8)Li_2O/（$ZrO_2+P_2O_5$）is 0.5～3.0，preferably Li_2O/（$ZrO_2+P_2O_5$）is 0.8～1.5.

19.The microcrystalline glass according to claim 15 or 16, wherein the components are expressed in weight percentage：Al_2O_3/（$Li_2O+ZrO_2+P_2O_5$）is 0.15～0.2；and/or Al_2O_3/Li_2O is below 0.4，preferably Al_2O_3/Li_2O is below 0.2.

20.The microcrystalline glass according to claim 15 or 16, comprising the following components by weight percentage：SiO_2：70～76%；and/or Al_2O_3：0.1～4.5%；and/or Li_2O：12.5～20%；and/or ZrO_2：7～12%；and/or P_2O_5：2～5%；and/or K_2O：0～4%；and/or MgO：0～2%；and/or ZnO：0～2%；and/or Na_2O：0～4%；and/or SrO：0～2%；and/or BaO：0～2%；and/or CaO：0～2%；and/or TiO_2：0～2%；and/or B_2O_3：0～3%；and/or Y_2O_3：0～4%；and/or fining agent：0～1%.

21.The microcrystalline glass according to claim 16, wherein the components are expressed in weight percentage：Al_2O_3/（$Li_2O+ZrO_2+P_2O_5$）is below 0.25；and/or Al_2O_3/Li_2O is below 0.7，preferably Al_2O_3/Li_2O is below 0.45；and/or Al_2O_3/（$P_2O_5+ZrO_2$）is 0.1～0.6；and/or（ZrO_2+Li_2O）/Al_2O_3 is 3.0～20.0.

22.The microcrystalline glass according to claim 16, comprising the following components by weight percentage：SiO_2：60～76%；and/or Al_2O_3：0.5～7%；and/or Li_2O：10～20%；and/or ZrO_2：7～12%；and/or P_2O_5：2～5%；and/or K_2O：0～4%；and/or MgO：0～2%；and/or ZnO：0～2%；and/or Na_2O：0～4%；and/or SrO：0～2%；and/or BaO：0～2%；and/or CaO：0～2%; and/or TiO_2：0～2%；and/or B_2O_3：0～3%；and/or Y_2O_3：0～4%；and/or fining agent：0～1%.

23.The microcrystalline glass according to claim 15 or 16, further comprising the following components by weight percentage：$La_2O_3+Gd_2O_3+Yb_2O_3+Nb_2O_5+WO_3+Bi_2O_3+Ta_2O_5+TeO_2+GeO_2$：0～5%；and/or NiO：0～4%；and/or Ni_2O_3：0～4%；and/or CoO：0～2%；and/or Co_2O_3：0～2%；and/or Fe_2O_3：0～7%；and/or MnO_2：0～4%；and/or Er_2O_3：0～8%；and/or Nd_2O_3：0～8%；and/or Cu_2O：0～4%；and/or Pr_2O_3：0～8%；and/or CeO_2：0～4%；and/or do not contain SrO；and/or do not contain BaO；and/or do not contain MgO；and/or do not contain CaO；and/or do not contain ZnO；and/or do not contain PbO；and/or do not contain As_2O_3；and/or do not contain TiO_2；and/or do not contain B_2O_3；and/or do not contain Y_2O_3；and/or do not contain F.

24.The microcrystalline glass according to claim 15 or 16, characterized in that the

crystalline phase of the microcrystalline glass contains a lithium silicate crystalline phase, and the lithium silicate crystalline phase has a higher weight percentage than other crystalline phases, and the lithium silicate crystalline phase accounts for 10 to 70% by weight of the microcrystalline glass, and preferably the lithium silicate crystalline phase accounts for 20 to 55% by weight of the microcrystalline glass.

25.The microcrystalline glass according to claim 15 or 16, characterized in that the crystalline phase of the microcrystalline glass contains a lithium monosilicate crystalline phase, a lithium monosilicate crystalline phase having a higher weight percentage than other crystalline phases, a lithium monosilicate crystalline phase accounting for 30-65% by weight of the microcrystalline glass, preferably a lithium monosilicate crystalline phase accounting for 40-55% by weight of the microcrystalline glass.

26.The microcrystalline glass according to claim 15 or 16, characterized in that the crystalline phase of the microcrystalline glass contains a lithium disilicate crystalline phase, the lithium disilicate crystalline phase has a higher weight percentage than other crystalline phases, the lithium disilicate crystalline phase accounts for 10～60% by weight of the microcrystalline glass, preferably the lithium disilicate crystalline phase accounts for 20-45% by weight of the microcrystalline glass.

27.The microcrystalline glass according to claim 15 or 16, characterized in that the microcrystalline glass contains lithium phosphate crystalline phase, and the lithium phosphate crystalline phase represents less than 5% by weight of the microcrystalline glass; and/or the microcrystalline glass contains quartz solid solution crystalline phase, and the quartz solid solution crystalline phase represents less than 5% by weight of the microcrystalline glass; and/or the microcrystalline glass contains petalite crystalline phase, and the petalite crystalline phase represents less than 5% by weight of the microcrystalline glass.

28.The microcrystalline glass according to claim 15 or 16, characterized in that the microcrystalline glass has a crystallinity of 50% or more, preferably 70% or more; and/or a grain size of 80nm or less, preferably 30nm or less; and/or a thermal expansion coefficient of 70×10^{-7}/K ～ 90×10^{-7}/K; and/or a refractive index of 1.5520 ～ 1.5700; and/or body drop height of 1700mm or more, preferably 2000mm or more; and/or Vickers hardness of 630kgf/mm^2 or more, preferably 680kgf/mm^2 or more; and/or dielectric constant of 5.4 or more, preferably 6.0 or more; and/or dielectric loss of 0.05 or less, preferably 0.01 or less; and/or surface resistance of $1\times10^{9}\Omega$ -cm or more, preferably $1\times10^{11}\Omega$-cm or more; and/or the haze of the microcrystalline glass of less than 1mm thickness is 0.2% or less, preferably 0.15% or less; and/or the average light transmission rate of the microcrystalline glass of less than 1mm thickness from 400 to 800nm wavelength is above 87%, preferably above 90%; and/or the light transmittance of 550nm wavelength of microcrystalline glass of less than 1mm thickness is above 88%, preferably above 91%; and/or the average light |B| value of 400-

800nm of microcrystalline glass of less than 1mm thickness is below 0.9, preferably below 0.7.

29.Matrix glass, comprising the following components by weight percentage: SiO_2：65～80%；Al_2O_3：below 5%；Li_2O：10～25%；ZrO_2：5～15%；P_2O_5：1～5%; and wherein $Al_2O_3/(Li_2O+ZrO_2+P_2O_5)$ is 0.15-0.3 and $(Li_2O+Al_2O_3)/ZrO_2$ is 1.5-2.5.

30.Matrix glass, comprising the following components by weight percentage: SiO_2：65～80%；Al_2O_3：below 10%；Li_2O：8～25%；ZrO_2：5～15%；P_2O_5：1～5%; and wherein $Al_2O_3/(Li_2O+ZrO_2+P_2O_5)$ is 0.15-0.3 and $(Li_2O+Al_2O_3)/ZrO_2$ is 1.5-2.5.

31.The matrix glass according to claim 29 or 30, further comprising the following components by weight percentage: K_2O：0～5%；and/or MgO：0～3%；and/or ZnO：0～3%；and/or Na_2O：0～6%；and/or SrO：0～5%；and/or BaO：0～5%；and/or CaO：0～5%；and/or TiO_2：0～5%；and/or B_2O_3：0～5%；and/or Y_2O_3：0～6%；and/or fining agent：0～2%.

32.The matrix glass according to claim 29 or 30, wherein the components are expressed in weight percentage , satisfying one or more of the following 8 situations:

1)Al_2O_3/（$P_2O_5+ZrO_2$）is below 1.2，preferably Al_2O_3/（$P_2O_5+ZrO_2$）is 0.05～0.7；

2) SiO_2/ZrO_2 is 6.0～9.0；

3)$P_2O_5+ZrO_2$：6～21%，preferably $P_2O_5+ZrO_2$：10～16%；

4)（ZrO_2+Li_2O）/Al_2O_3 is above 2.0，preferably（ZrO_2+Li_2O）/Al_2O_3 is 2.5～30.0；

5)（$SiO_2+Al_2O_3$）/ZrO_2 is 4.0～16.0，preferably（$SiO_2+Al_2O_3$）/ZrO_2 is 6.0～9.5；

6)（Li_2O+ZrO_2）/SiO_2 is 0.19～0.55，preferably（Li_2O+ZrO_2）/SiO_2 is 0.25～0.45；

7)（MgO+ZnO）/ZrO_2 is below 0.65，preferably（MgO+ZnO）/ZrO_2 is below 0.1；

8)Li_2O/（$ZrO_2+P_2O_5$）is 0.5～3.0，preferably Li_2O/（$ZrO_2+P_2O_5$）is 0.8～1.5。

33.The matrix glass according to claim 29 or 30, wherein the components are expressed in weight percentage: Al_2O_3/（$Li_2O+ZrO_2+P_2O_5$）is 0.01～0.2；and/or Al_2O_3/Li_2O is below 0.4，preferably Al_2O_3/Li_2O is below 0.2.

34.The matrix glass according to claim 29 or 30, comprising the following components by weight percentage: SiO_2：70～76%；and/or Al_2O_3：0.1～4.5%；and/or Li_2O：12.5～20%；and/or ZrO_2：7～12%；and/or P_2O_5：2～5%；and/or K_2O：0～4%；and/or MgO：0～2%；and/or ZnO：0～2%；and/or Na_2O：0～4%；and/or SrO：0～2%；and/or BaO：0～2%；and/or CaO：0～2%；and/or TiO_2：0～2%；and/or B_2O_3：0～3%；and/or Y_2O_3：0～4%；and/or fining agent：0～1%.

35.The matrix glass according to claim 30, wherein the components are expressed in weight percentage: Al_2O_3/（$Li_2O+ZrO_2+P_2O_5$）is below 0.25；and/or Al_2O_3/Li_2O is below 0.7，preferably Al_2O_3/Li_2O is below 0.45；and/or Al_2O_3/（$P_2O_5+ZrO_2$）is 0.1～0.6；and/or（ZrO_2+Li_2O）/Al_2O_3 is 3.0～20.0.

36.The matrix glass according to claim 30, comprising the following components by weight percentage: SiO_2：60～76%；and/or Al_2O_3：0.5～7%；and/or Li_2O：10～20%；

and/or ZrO_2：7～12%；and/or P_2O_5：2～5%；and/or K_2O：0～4%；and/or MgO：0～2%；and/or ZnO：0～2%；and/or Na_2O：0～4%；and/or SrO：0～2%；and/or BaO：0～2%；and/or CaO：0～2%；and/or TiO_2：0～2%；and/or B_2O_3：0～3%；and/or Y_2O_3：0～4%；and/or fining agent：0～1%.

37.The matrix glass according to claim 29 or 30, further comprising the following components by weight percentage: $La_2O_3+Gd_2O_3+Yb_2O_3+Nb_2O_5+WO_3+Bi_2O_3+Ta_2O_5+TeO_2+GeO_2$：0～5%；and/or NiO：0～4%；and/or Ni_2O_3：0～4%；and/or CoO：0～2%；and/or Co_2O_3：0～2%；and/or Fe_2O_3：0～7%；and/or MnO_2：0～4%；and/or Er_2O_3：0～8%；and/or Nd_2O_3：0～8%；and/or Cu_2O：0～4%；and/or Pr_2O_3：0～8%；and/or CeO_2：0～4%；and/or do not contain SrO；and/or do not contain BaO；and/or do not contain MgO；and/or do not contain CaO；and/or do not contain ZnO；and/or do not contain PbO；and/or do not contain As_2O_3；and/or do not contain TiO_2；and/or do not contain B_2O_3；and/or do not contain Y_2O_3；and/or do not contain F.

38.The matrix glass according to claim 29 or 30, characterized in that the thermal expansion coefficient of the matrix glass is 65×10^{-7}/K to 80×10^{-7}/K; and/or the refractive index is 1.5400 to 1.5600.

39.Microcrystalline glass forming body, characterized in that it contains the microcrystalline glass of any one of claims 15 to 28.

40.Glass cover, characterized in that it contains the microcrystalline glass product of any one of claims 1 to 14, and/or the microcrystalline glass of any one of claims 15 to 28, and/or the matrix glass of any one of claims 29 to 38, and/or the microcrystalline glass forming body of claim 39.

41.Glass component, characterized in that it contains the microcrystalline glass product of any one of claims 1 to 14, and/or the microcrystalline glass of any one of claims 15 to 28, and/or the matrix glass of any one of claims 29 to 38, and/or the microcrystalline glass forming body of claim 39.

42.Display device, characterized in that it contains the microcrystalline glass product of any one of claims 1 to 14, and/or the microcrystalline glass of any one of claims 15 to 28, and/or the matrix glass of any one of claims 29 to 38, and/or the microcrystalline glass forming body of claim 39, and/or the glass cover of claim 40, and/or the glass component of claim 41.

43.Electronic device, characterized in that it contains the microcrystalline glass article of any one of claims 1 to 14, and/or the microcrystalline glass of any one of claims 15 to 28, and/or the matrix glass of any one of claims 29 to 38, and/or the microcrystalline glass forming body of claim 39, and/or the glass cover of claim 40, and/or the glass component of claim 41.

44.The method of manufacturing microcrystalline glass products according to any one of

claims 1 to 14, characterized in that the method comprises the steps of: forming a matrix glass, forming the matrix glass into microcrystalline glass by a crystallization process, and then forming the microcrystalline glass products by a chemical strengthening process.

45.The method of manufacturing microcrystalline glass products according to claim 44, characterized in that the crystallization process comprises the steps of: increasing the temperature to a specified crystallization treatment temperature, maintaining the temperature for a certain period of time after reaching the crystallization treatment temperature, and then cooling it down, which is 580 ～ 750°C, preferably 600 ～ 700°C, and maintaining the temperature at the crystallization treatment temperature for 0 ～ 8 hours, preferably 1～ 6 hours.

46.The method for manufacturing microcrystalline glass products according to claim 44, characterized in that the crystallization process comprises the steps of: performing the nucleation process at a 1st temperature, followed by the crystal growth process at a 2nd temperature higher than the nucleation process temperature, the 1st temperature being 470～ 580°C and the 2nd temperature being 600～ 750°C; the holding time at the 1st temperature being 0 ～ 24 hours, preferably 2 ～ 15 hours; the holding time at the 2nd temperature is 0 ～ 10 hours, preferably 0.5 ～ 6 hours.

47.The method of manufacturing a microcrystalline glass product according to claim 44, characterized in that the chemical strengthening process comprises: submerging the microcrystalline glass in a salt bath of molten Na salt at a temperature of 350 ～ 470°C for 1 ～ 36 hours, preferably in the temperature range of 380 ～ 460°C, and preferably in the time range of 2 ～ 24 hours; and/or submerging the microcrystalline glass in a salt bath of molten K salt in a salt bath for 1～ 36 hours, preferably in the time range of 2 ～ 24 hours; and/or microcrystalline glass immersed in a mixed salt bath of molten K and Na salts at a temperature of 360°C ～ 450°C for 1 ～ 36 hours, preferably in the time range of 2 ～ 24 hours.

48.The method of manufacturing microcrystalline glass according to any one of claims 15 to 28, characterized in that the method comprises the steps of: forming a matrix glass, forming the matrix glass into microcrystalline glass by a crystallization process.

49.The method of manufacturing microcrystalline glass according to claim 48, characterized in that the crystallization process comprises the steps of: increasing the temperature to a specified crystallization treatment temperature, maintaining the temperature for a certain time after reaching the crystallization treatment temperature, and then cooling it down, which is 580 ～ 750°C, preferably 600 ～ 700°C, and maintaining the temperature at the crystallization treatment temperature for 0 ～ 8 hours, preferably 1 ～ 6 hours.

50.The method for manufacturing microcrystalline glass according to claim 48, characterized in that the crystallization process comprises the steps of: performing the

nucleation process at a 1st temperature, followed by the crystal growth process at a 2nd temperature higher than the nucleation process temperature, the 1st temperature being 470 ～ 580°C and the 2nd temperature being 600～750°C; the holding time at the 1st temperature being 0 ～24 hours, preferably, 2 ～ 15 hours; the holding time at the 2nd temperature is 0 ～ 10 hours, preferably 0.5 ～ 6 hours.

51.Method of manufacturing microcrystalline glass forming body according to claim 39, characterized in that the method includes grinding or polishing the microcrystalline glass to make microcrystalline glass forming body, or making microcrystalline glass forming body by heat bending process or pressing process of matrix glass or microcrystalline glass at a certain temperature.

52.Method of manufacturing microcrystalline glass forming body according to claim 39, characterized in that the method comprises the following steps: subjecting the matrix glass to a crystallization heat treatment process, including heating up, holding nucleation, heating up, holding crystallization, and cooling down to room temperature to form pre-crystallized glass; and thermally processing and molding the pre-crystallized glass to obtain the microcrystalline glass forming body.

53.Method of manufacturing a microcrystalline glass forming body according to claim 39, characterized in that the method comprises the steps of:

1)Heating preheating: the matrix glass or pre-crystallized glass or microcrystalline glass placed in the mold, the mold in the heat bender through each heating site in turn, and stay in each site for a certain period of time insulation, preheating zone temperature of 400 ～ 800 ℃, the pressure of 0.01 ～ 0.05MPa, the time of 40 ～ 200s.

2)Pressurized forming: the mold is transferred to the forming site after preheating, and the hot bender applies a certain pressure to the mold, with a pressure range of 0.1 ～ 0.8 MPa, a temperature range of 650 ～ 850°C at the forming site, and a forming time range of 40 to 200 s.

3)Holding pressure cooling: transfer the mold to the cooling site to cool down station by station, cooling temperature range of 750 ～ 500 ℃, pressure of 0.01 ～ 0.05Mpa, time of 40 ～200s.