What is claimed is:

1. A method for manufacturing an insulated spherical weld gold wire for integrated circuit double-layer stacked package, comprising the following steps:

step S1: alloy sheet preparation: preparing a gold-cobalt alloy sheet, a gold-lanthanum alloy sheet, a gold-cerium alloy sheet and a gold-germanium alloy sheet according to weight percentages, respectively;

step S2: alloy rod preparation: preparing a gold-cobalt-lanthanum-cerium-germanium gold alloy rod with a diameter of 8 mm from the gold-cobalt alloy sheet, gold-lanthanum alloy sheet, gold-cerium alloy sheet and gold-germanium alloy sheet prepared in step S1;

step S3: stretching: successively subjecting the 8 mm gold-cobalt-lanthanum-cerium-germanium gold alloy rod prepared in step S2 to rough stretching, medium stretching, fine stretching, and micro-stretching to form a spherical weld gold wire with a diameter of 0.011 mm-0.050 mm;

step S4: annealing treatment: placing the spherical weld gold wire prepared in step S3 in a continuous annealing system, using high-purity nitrogen as a protective gas, at a temperature of 300℃-600℃ and a speed of 40 m-80 m/min to perform a continuous annealing treatment;

step S5: activation treatment: placing the annealed spherical weld gold wire in a continuous activation treatment system, wherein the wire passes through an activation acid solution with a concentration of 3%-10% by weight, wherein the solution temperature is 50℃-120℃; meanwhile, applying ultrasonic waves with a power of 45W and a frequency of 8 KHZ-40 KHZ to the solution, performing activation treatment at a speed of 40 m-80 m/min, and performing drying treatment during winding, wherein the drying temperature is 100℃-120℃;

step S6: spin-coating an insulating coating: diluting the high-performance polyaryletherketone coating to a concentration of 8%-15% by weight using acetone, and adjusting the spin-coating pressure to be 0.1 Mpa-0.3 Mpa; passing the wire through an annular outlet with a pressure of 0.15 Mpa-0.2 Mpa at a speed of 100 m/min-200 m/min, performing spin-coating of high-performance polyaryletherketone coating on wire surface for 360 degrees at constant velocity and pressure at the annular outlet to uniformly form a protective coating, adjusting the spin-coating pressure and the running speed of the wire, and controlling the thickness of the coating to be 0.3 nm-1 nm;

step S7: spin-coated insulating coating curing treatment: passing the wire after spin-coating through a U-shaped curing device with a length of 500 mm and a heating temperature of 300℃-400℃ at a speed of 100 m/min-200 m/min to cure the high-performance

polyaryletherketone coating so that the coating firmly adheres to the surface of the wire; and

step S8: multi-winding and sub-packaging: sizing the wire treated in step S7 in a single roll, controlling tension to be 0.8 gf-8.0 gf, and sizing in a single roll of a length of 500m or 1000m.

2. The method for manufacturing an insulated spherical weld gold wire for integrated circuit double-layer stacked package according to claim 1, wherein in step S1, the gold-cobalt alloy sheet is prepared by: placing 0.1%-0.5% cobalt and 99.9%-99.5% gold by weight percentage into a high-purity graphite crucible, respectively, and placing same in a vacuum alloy furnace, vacuumizing and heating same to 1100℃-1300℃; after the material is completely melted, filling high-purity argon as protection, preserving the temperature for 30 min-90 min, and pouring the alloy melt into a graphite mold to obtain a massive gold-cobalt alloy ingot; and rolling the alloy ingot into a sheet having a thickness of 0.2 mm to 0.5 mm in several passes to obtain a gold-cobalt alloy sheet.

3. The method for manufacturing an insulated spherical weld gold wire for integrated circuit double-layer stacked package according to claim 2, wherein in step S1, the gold-lanthanum alloy sheet is prepared by: placing 0.1%-0.5% lanthanum and 99.9%-99.5% gold by weight percentage into a high-purity graphite crucible, respectively, and placing same in a vacuum alloy furnace, vacuumizing and heating same to 1100℃-1300℃; after the material is completely melted, filling high-purity argon as protection, preserving the temperature for 30 min-90 min, and pouring the alloy melt into a graphite mold to obtain a massive gold-lanthanum alloy ingot; and rolling the alloy ingot into a sheet having a thickness of 0.2 mm to 0.5 mm in several passes.

4. The method for manufacturing an insulated spherical weld gold wire for integrated circuit double-layer stacked package according to claim 3, wherein in step S1, the gold-cerium alloy sheet is prepared by: placing 0.1%-0.5% cerium and 99.9%-99.5% gold by weight percentage into a high-purity graphite crucible, respectively, and placing same in a vacuum alloy furnace, vacuumizing and heating same to 1100℃-1300℃; after the material is completely melted, filling high-purity argon as protection, preserving the temperature for 30 min-90 min, and pouring the alloy melt into a graphite mold to obtain a massive gold-cerium alloy ingot; and rolling the alloy ingot into a sheet having a thickness of 0.2 mm to 0.5 mm in several passes.

5. The method for manufacturing an insulated spherical weld gold wire for integrated circuit double-layer stacked package according to claim 1, wherein in step S1, the gold-germanium alloy sheet is prepared by: placing 0.1%-0.5% germanium and 99.9%-99.5% gold

by weight percentage into a high-purity graphite crucible, respectively, and placing same in a vacuum alloy furnace, vacuumizing and heating same to 1100℃-1300℃; after the material is completely melted, filling high-purity argon as protection, preserving the temperature for 30 min-90 min, and pouring the alloy melt into a graphite mold to obtain a massive gold-germanium alloy ingot; and rolling the alloy ingot into a sheet having a thickness of 0.2 mm to 0.5 mm in several passes.

6. The method for manufacturing an insulated spherical weld gold wire for integrated circuit double-layer stacked package according to claim 1, wherein in step S2, the gold-cobalt-lanthanum-cerium-germanium gold alloy rod is prepared by: placing the gold ingot with a purity of ≥ 99.99% and the gold-cobalt alloy sheet, the gold-lanthanum alloy sheet, the gold-cerium alloy sheet and the gold-germanium alloy sheet prepared in step S1 in a high-purity graphite crucible by weight percentage, placing same in a vacuum pull-down continuous casting furnace, vacuumizing and heating same to 1100℃-1350℃, preserving the temperature for 15 min-60 min after the materials are completely melted, and performing electromagnetic stirring; refining same for 10 min-60 min after stirring, and obtaining a gold rod with the diameter of 8 mm through pull-down continuous casting using a directional solidification method with a traction speed being controlled at 50 mm/min-120 mm/min.

7. The method for manufacturing an insulated spherical weld gold wire for integrated circuit double-layer stacked package according to claim 6, wherein in step S2, the gold-cobalt-lanthanum-cerium-germanium gold alloy rod is composed of 0.0001%-1.5% of cobalt, 0.0005%-0.001% of lanthanum, 0.0005%-0.001% of cerium, and balance of gold.

8. The method for manufacturing an insulated spherical weld gold wire for integrated circuit double-layer stacked package according to claim 1, wherein the purity of cobalt, lanthanum, cerium, and germanium is ≥ 99.99%, and the purity of gold is ≥ 99.999%.

9. The method for manufacturing an insulated spherical weld gold wire for integrated circuit double-layer stacked package according to claim 2, wherein the density of graphite is ≥ 1.65 g/cm^3 and the density of ash is ≤ 100 ppm in high-purity graphite crucible and graphite mold.

10. The method for manufacturing an insulated spherical weld gold wire for integrated circuit double-layer stacked package according to claim 9, wherein in step S6, the protective coating has a thickness of 0.3 nm to 1 nm.