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**Specification for pastes of precious metal used for  
microelectronics**

微电子技术用贵金属浆料规范

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# Specification for pastes of precious metal used for microelectronics

**Warning -- The personnel using this document shall have practical experience in formal laboratory work. This document does not indicate all possible safety issues. The user is responsible for taking appropriate safety and health measures and ensuring compliance with the conditions stipulated by relevant national laws and regulations.**

## 1 Scope

This document specifies the classification, technical requirements, test methods, inspection rules, marking, packaging, transportation, storage, accompanying documents, and order form content of precious metal pastes for microelectronics technology.

This document applies to sintering pastes and curable pastes of precious metal for microelectronics technology (hereinafter referred to as “pastes”). This document can also be a reference to the application of non-precious metal pastes.

## 2 Normative references

The following documents contain the provisions which, through normative reference in this document, constitute the essential provisions of this document. For the dated referenced documents, only the versions with the indicated dates are applicable to this document; for the undated referenced documents, only the latest version (including all the amendments) is applicable to this document.

GB/T 6739 Paints and varnishes - Determination of film hardness by pencil test

GB/T 13452.2 Paints and varnishes - Determination of film thickness

GB/T 17473.1 Test methods of precious metals pastes used for microelectronics - Determination of solids content

GB/T 17473.2 Test methods of precious metals pastes used for microelectronics - Determination of fineness

GB/T 17473.3 Test methods of precious metals pastes used for microelectronics - Determination of sheet resistance

GB/T 17473.4 Test methods of precious metals pastes used for microelectronics - Determination of adhesion

GB/T 17473.5 Test methods of pastes used for microelectronics - Determination of viscosity

GB/T 17473.6 Test methods of precious metal pastes used for microelectronics - Determination of resolution

GB/T 17473.7 Test methods of precious metals pastes used for microelectronics - Part 7: Determination of solderability and solder leaching resistance

### **3 Terms and definitions**

The following terms and definitions apply to this document.

#### **3.1 sintering pastes of precious metal**

A slurry or paste that is suitable for printing or coating and consists of powders of precious metals or their compounds, additives, and organic vehicles.

Note: At a certain temperature (400 °C~1600 °C), it can be sintered with the substrate to form an inorganic functional phase.

#### **3.2 curable pastes of precious metal**

A slurry or paste that is suitable for printing or coating and consists of powder, flake powder of precious metals or their compounds, inorganic additives, organic additives, organic resins, and organic solvents.

Note: It can be cured and adhere to a substrate at a certain temperature (25 °C~400 °C) or under the irradiation of ultraviolet light (electromagnetic waves with a wavelength of 100 nm~400 nm) or under the irradiation of electron beam radiation (the energy of electrons is 30 keV~300 keV) to form a functional phase.

#### **3.3 solids content**

After the paste is burned at 750 °C, the ratio of the mass of the remaining substance to the mass of the sample, which is expressed in mass fraction. (It is applicable to sintering pastes.)

After the paste is heated at a certain temperature (25 °C~400 °C) or irradiated under ultraviolet light (electromagnetic waves with a wavelength of 100 nm~400 nm) or the electron beam radiation (the energy of electrons is 30 keV~300 keV) to become constant in weight, the ratio of the mass of the remaining substance to the mass of the sample, which is expressed in mass fraction. (It is applicable to curable pastes.)

represented by C.

c --- Usages of the paste. C means the conductive paste; R means the resistive paste.

d --- Metal phase composition. The chemical element symbol is used to indicate the metal name, and the number after the element symbol indicates the mass fraction of the metal in the metal phase.

e --- Product number. Each manufacturer defines the product number by itself according to actual needs.

Example:

PSC-Ag80Pd20-0120 represents the sintering silver-palladium conductive paste that contains 80% silver and 20% palladium, and its product number is 0120.

## **5 Technical requirements**

### **5.1 Appearance quality**

The paste shall be a slurry or paste of uniform color.

### **5.2 Performance indicators**

The main technical indicators of the paste include solids content, fineness, sheet resistance, adhesion, viscosity, resolution, solderability, soldering resistance, hardness and thickness of the cured film, and both the supplier and the buyer shall reach an agreement on other acceptable technical indicators.

## **6 Test methods**

**6.1** The inspection of various indicators of the paste shall be carried out in an environment with a temperature of 15 °C~35 °C, relative humidity of 45%~75%, and an atmospheric pressure of 86 kPa~106 kPa.

**6.2** Visual inspection is used for appearance quality.

**6.3** The solids content test shall be carried out according to the provisions of GB/T 17473.1.

**6.4** The fineness test shall be carried out according to the provisions of GB/T 17473.2.

**6.5** The sheet resistance test shall be carried out according to the provisions of GB/T 17473.3.

**6.6** The adhesion test shall be carried out according to the provisions of GB/T 17473.4.

**6.7** The viscosity test shall be carried out according to the provisions of GB/T 17473.5.

**6.8** The resolution test shall be carried out according to the provisions of GB/T 17473.6.

**6.9** The solderability and soldering resistance tests shall be carried out in accordance with the provisions of GB/T 17473.7.

**6.10** The hardness test of the cured film shall be carried out in accordance with the provisions of GB/T 6739.

**6.11** The thickness test of the cured film shall be carried out according to the provisions of GB/T 13452.2.

**6.12** Other testing contents and testing methods shall be agreed upon by the supplier and the buyer.

## **7 Inspection rules**

### **7.1 Inspection and acceptance**

**7.1.1** The paste shall be inspected by the supplier or a third party to ensure that the product quality complies with the provisions of this document and the order form.

**7.1.2** The purchaser shall inspect the received products according to the provisions of this document. If the inspection result does not meet the requirements of the provisions, it shall be reported to the supplier within one month from the date of receipt of the product, and the supplier and the buyer shall negotiate to resolve it. If arbitration is required, an organization recognized by both parties can be entrusted to conduct the sampling and inspections.

### **7.2 Batch formation**

The paste shall be submitted for acceptance in batches, and each batch shall be composed of products of the same grade and batch number; the weight of the batch is not limited.

### **7.3 Inspection items and sampling**

The supplier shall determine the inspection items and sampling methods for the paste according to Table 1 and the requirements of the buyer for the use of the paste.

The special inspection items proposed by the buyer shall be agreed upon by the supplier and the buyer, and shall be indicated in the order form.

- b) Product name;
- c) Product grade;
- d) Product batch number;
- e) Bottle weight;
- f) Net weight of the product;
- g) Storage conditions, production date, and shelf life;
- h) Warning signs or warning instructions.

### **8.1.2 Packaging marks**

A label shall be affixed on the packaging box and indicate:

- a) Product name;
- b) Product grade;
- c) Product batch number;
- d) Number and size of bottles;
- e) Date of manufacture;
- f) Manufacturer;
- g) Marks such as “Fragile”, “Moisture protection” and “Heat protection”.

## **8.2 Packaging, transportation, storage**

**8.2.1** The packaging bottle shall be resistant to paste corrosion and not easily damaged. The mouth of the bottle shall be wrapped and sealed with adhesive tape, and then put into a packing box, and the surroundings of the packaging bottle shall be filled with safety substances. The outer packaging shall be in accordance with the provisions of GB/T 19445.

**8.2.2** Transportation shall prevent pollution, fire, moisture, and heat. When there are special needs, they shall be indicated in the order contract.

**8.2.3** The paste shall generally be stored at 5 °C~25 °C, and the shelf life is 6 months. The transportation and storage conditions of the paste with special requirements need to be negotiated by both parties and specified in the order contract.

## **8.3 Accompanying documents**

**This is an excerpt of the PDF (Some pages are marked off intentionally)**

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