

Introduction of PI Material

PI plastics materials generally refer to polyimide, which is one of the organic polymer materials with the best comprehensive performance. Its high temperature resistance is over 400 C, long-term use temperature range - 200 - 300 C, part of no obvious melting point, high insulation performance, dielectric constant at 103 Hz is 4.0, dielectric loss is only 0.004 - 0.007, belonging to F to H.

According to the chemical structure of repetitive units, polyimides can be divided into aliphatic, semi-aromatic and aromatic polyimides. According to the interaction force between chains, it can be divided into cross-linking and non-cross-linking [1].

Polyimide is a kind of polymer containing imide ring (-CO-N-CO-) in the main chain, among which the polymer containing phthalimide structure is the most important. As a special engineering material, polyimide has been widely used in aviation, aerospace, microelectronics, nanometer, liquid crystal, separation membrane, laser and other fields. In the 1960s, the research, development and utilization of polyimide were listed as one of the most promising engineering plastics in the 21st century.

Polyimide, because of its outstanding characteristics in performance and synthesis, whether as structural materials or functional materials, has been fully recognized for its huge application prospects, known as "proton solver", and that "without polyimide, there will be no today's microelectronics technology".

Application:

1. Film: It is one of the earliest products of polyimide. It is used for slot insulation of motors and cable winding materials. Transparent polyimide film can be used as a soft solar cell bottom plate. 2.

Coatings: Used as insulating paint for electromagnetic wires, or as high temperature resistant paint.

3. Advanced Composite Materials: Used in Aerospace, Aircraft and Rocket Components. It is one of the most heat-resistant structural materials. For example, the US supersonic airliner plans to design a speed of 2.4M, a surface temperature of 177 C during flight, and a service life of 60,000 H. It has been reported that 50% of the structural materials are carbon fiber reinforced composites based on thermoplastic polyimide resin, and the dosage of each aircraft is about 30 tons.

4. Fiber: The modulus of elasticity is second only to that of carbon fibers. It is used as filter material for high temperature media and radioactive materials, and as bullet-proof and fire-proof fabric.

5. Foam plastics: used as heat-resistant and heat-insulating materials.
6. Engineering plastics: Thermosetting and thermoplastic, thermoplastic can be moulded or injection moulded or transfer moulded. Mainly used for self-lubrication, sealing, insulation and structural materials. Guangcheng polyimide material has been used in compressor rotor, piston ring and special pump seal and other mechanical components.
7. Adhesive: Used as high temperature structural adhesive. Guangcheng polyimide adhesive has been produced as high insulation filling material for electronic components.
8. Separation Membrane: Used for the separation of various gas pairs, such as hydrogen/nitrogen, nitrogen/oxygen, carbon dioxide/nitrogen or methane, to remove water from air hydrocarbon feed gas and alcohols. It can also be used as pervaporation membrane and ultrafiltration membrane. Because of the heat resistance and solvent resistance of polyimide, it is very important for the separation of organic gases and liquids.
9. Photoresist: Negative and positive adhesives with sub-micron resolution. It can be used in color filter film with pigments or dyes, which can greatly simplify the processing process.
10. Application in microelectronic devices: as a dielectric layer for interlayer insulation, as a buffer layer can reduce stress and improve the yield. As a protective layer, it can reduce the influence of environment on

devices, shield a-particles, and reduce or eliminate the soft error of devices.

11. Orientation alignment agent for liquid crystal display: polyimide plays an important role in TN-LCD, STN-LCD, TFT-LCD and future alignment agent materials for ferroelectric liquid crystal display.

12. Electro-optical materials: As optical switch materials for passive or active waveguide materials, fluorinated polyimides are transparent in the range of communication wavelength, and the stability of materials can be improved by using polyimide as chromophore matrix.

13. Humidity sensitive materials: The principle of linear expansion of moisture absorption can be used to make humidity sensors.