Super Detailed Introduction of the Main Compone of the Adhesive

Detail Introduction :

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The composition of adhesives varies greatly depending on the source and use of the raw materials. T design of natural bonds is relatively simple, primarily one-component; Simultaneously, synthetic adh are more complex than the essential bonding substances. To meet the specific use function, it is nece add various compounding agents. For example, to accelerate curing, shorten bonding time, and redu reaction temperature, catalysts, accelerators, etc. can be added; adding antioxidants can improve res to atmospheric aging, thermal aging, ozone aging, etc.; adding fillers can not only increase strength b reduce The addition of plasticizer or toughening agent can reduce the rigidity of the adhesive layer ar increase the toughness; the addition of diluent can reduce the viscosity and improve the construction performance.

Generally speaking, adhesives include primary materials, auxiliary materials, and auxiliaries. The mai materials are mainly adhesive (rubber) and curing agents. The adhesive can play a general bonding ro these two kinds of raw materials. Of course, some adhesives can be fixed without a curing agent und external conditions, such as elevated temperature. Excipients and auxiliaries mainly include accelerat toughening agents, plasticizers, thickeners, diluents, antioxidants, polymerization inhibitors, coupling initiators, photosensitizers, defoaming agents, preservatives, fillers agents, solvents, etc. Except for th compound, which is essential, the rest of the components depend on specific requirements.

main ingredient

(1) Rubber compound

The glue, also known as the base material or the adhesive, is a component that plays a significant rol combining two adherents, and it determines the basic properties of the adhesive. The sizing material can be used as adhesives include natural polymer compounds, modified natural polymer compounds synthetic polymer compounds, organic compounds, inorganic compounds, etc.

Natural polymer compounds The natural polymer compounds that can be used to formulate adhesi include Starch, dextrin, peach gum, gum arabic, bone glue, skin glue, gelatin, fish glue, shellac, vegeta protein, casein, blood meal, rosin , asphalt, natural rubber, etc.

Modified natural polymer compounds Some natural polymer compounds can be used as adhesives

proper chemical modification, such as nitrocellulose, cellulose acetate, carboxymethyl cellulose, rosi
phenolic resin, modified Starch, chlorinated rubber, etc.

Synthetic polymer compounds Synthetic polymer compounds are the best-performing and most-us
materials among adhesives, including synthetic resins, synthetic rubbers, thermoplastic elastomers, e

Organic compounds The main components of some synthetic adhesives are not high molecular com
or prepolymers, but low molecular organic compounds (or monomers), but the final products are hig
molecular compounds, instant adhesives and Oxygen adhesives fall into this category.

Inorganic compounds Inorganic compounds such as silicates, nitrates, borates, phosphates, magnes
oxide, and zinc oxide can be used to formulate inorganic adhesives, which have unique high-tempera
resistance properties. (2) curing agent

For some types of adhesives, the curing agent has an important influence on the performance of the
which should be determined according to the kind of adhesive in the cement, the performance requi
of the adhesive parts, specific process methods, environmental protection issues, health hazards and
choose the ideal curing agent.

Curing agent, also known as hardener and curing agent, is the most critical compounding material in
adhesives. It reacts with the host polymer directly or through a catalyst. It can convert a soluble and f
linear structure polymer compound into an insoluble and infusible body structure in a relatively shor
the same time, the curing agent participates in the chemical reaction. Become part of the cured prod
introduction of the curing agent molecules significantly changed the intermolecular distance, morpho
thermal stability, chemical stability, etc. Some resins such as epoxy resin, urea-formaldehyde resin, a
curing agents are indispensable.

Excipients and Auxiliaries

(1) Accelerator

Any substance that can speed up the curing reaction rate of the adhesive can be called an accelerato
addition of the accelerator can accelerate the reaction between the host polymer and the curing agen
sticky, shorten the curing time, reduce the curing temperature, reduce the amount of the curing agen
adjust the curing rate of the resin in the adhesive. At the same time, the addition of accelerators can
improve the physical and mechanical properties. For example, DMP-30 can cure epoxy-polysulfide-lo
molecular weight polyamide adhesive even below 15 ; 2-ethyl-4-methylimidazole can reduce the tem
of dicyandiamide curing epoxy resin.

(2) Plasticizers and toughеners

Plasticizer

Plasticizers are a class of high-boiling, hardly volatile liquids or low-melting solids that can increase th
of the adhesive and make the film flexible. The plasticizer has low viscosity and a high boiling point, w
increase the fluidity of the resin, which is beneficial to infiltration, diffusion, and adsorption. Plasticize

generally do not chemically react with the main components of the adhesive. They can be considered resinous or monomeric "filler" that segregates from the system during the curing process by weaken polymer. The physical effect of intermolecular force reduces brittleness and increases toughness, but adhesive film's rigidity, strength, and thermal deformation temperature will decrease. The componer plasticizer and adhesive must have good compatibility to ensure the stable and durable performance bond. Commonly used plasticizers are dimethyl phthalate, diethyl phthalate, dibutyl phthalate, dipen phthalate, dioctyl phthalate, triethyl phosphate ester, tributyl phosphate, etc.

Toughening agent

The toughening agent is a compound that contains active groups and can interact with resin. It can re sizing material to become part of the curing system, but it is not entirely compatible after curing and sometimes even separates phases. Toughening agents can improve the shear strength, peel strength temperature performance, and flexibility of adhesives. The active group of the toughening agent dire participates in the rubber compound reaction, which can not only improve the brittleness, cracking, a defects of the adhesive without affecting the main properties of the adhesive but also improve the im strength and elongation of the adhesive. For example, carboxyl-terminated liquid nitrile rubber (CTBN excellent toughening agent for epoxy resins. The peel strength of the epoxy resin-CTBN system after 120 is 4.4-13.2kN/m, and the shear strength is 27-41MPa. Commonly used toughening agents are a unsaturated polyester resin, polysulfide rubber, nitrile rubber, liquid nitrile rubber, neoprene, polyur etc.

(3) Diluent and solvent

Thinner

Thinners are free-flowing liquids that reduce the viscosity of adhesives. Adding a diluent can make th have good penetrating power, improve the wettability, improve the processability of the bond, reduc activity of the bond, and prolong the service life of the bond. Diluents are roughly divided into two ca namely reactive diluents that can participate in the curing reaction and volatile or non-volatile non-re diluents that only physically mix. The molecule of the reactive diluent contains active groups. It engag diluting the adhesive and gas escapes, which can improve some adhesive properties. Reactive diluent primarily used in epoxy resin adhesives, and other types of adhesives are used less. The non-reactive does not participate in the reaction during the dilution process and only achieves the purpose of mec mixing and viscosity reduction. After adding the diluent, more fillers can be added to change the adh properties and also reduce the cost.

Solvent

It refers to the liquid that can reduce the intermolecular force of some solid or liquid and disperse th dissolved substance into molecules or ions. It is an indispensable component of solvent-based adhes General organic solvents have certain toxicity, flammability, and explosion, which pollute the environ

and have hidden dangers to safety. Therefore, solvent-based adhesives are gradually limited. Solvent used more in rubber adhesives and are rarely used in other adhesives. Its effect is basically the same of a non-reactive diluent but differs in the degree of dilution. When different solvents are added to th adhesive, the viscosity of the adhesive is different, and the physical properties are also different.

(4) Packing

Filler is one of the important compounding agents of adhesives, which plays a very important role in improving the performance of adhesives and reducing the cost of products. With reinforcement, thic compatibilization, flame retardant, wear resistance, increase hardness, reduce shrinkage, reduce the expansion coefficient, increase thermal conductivity, electrical conductivity, thixotropy, improve wate resistance, heat resistance, aging resistance, Extend the validity period and other functions. In genera do not chemically react with components such as sizing materials and curing agents, and their main f are as follows.

Improve mechanical properties

Commonly used fillers, such as metal powders and metal oxides, can improve the compressive streng dimensional stability of the adhesive and reduce the shrinkage rate. But it will also reduce some prop the adhesive, such as peel strength. Adding carbon black, white carbon black, calcium carbonate, etc. rubber can improve the tensile strength, hardness, and wear resistance. Give the adhesive a new fu adhesive to add the silver powder to make conductive adhesive; use carbonyl iron powder to make m conductive adhesive; use copper and aluminum powder as filler to improve the thermal conductivity adhesive; add chromium to epoxy resin Zinc acid can improve the retention rate of strength. Adding antimony trioxide to the filler can enhance the resistance to oxidative damage; adding Zr (SiO3), two reduce the water absorption of epoxy resin; adding fumed SiO2 can improve the adhesion. The thixo the agent improves the process performance.

Reduce joint stress

The curing reaction is often an exothermic reaction, and the filler can prevent local overheating; in m cases, curing shrinkage occurs during the bonding process, and the filler can adjust the shrinkage—e penetration into the wood results in a lack of glue and glue penetration. Improve the operation proc adhesive can obtain thixotropy through the thickening of the filler, which can adjust the curing rate, p the service life, and facilitate the operation and construction. The amount of filler should be appropri only to provide the corresponding function but also to ensure the overall superiority of the adhesive formulation. In the dispensing formula, the filler will increase the viscosity of the adhesive, making it to operate, unevenly mixing the glue, and worsening the wettability of the adhesive and the adheren resulting in a decrease in the bonding strength.

(5) Coupling agent

In the bonding process, in order to form a firm interface layer between the adhesive and the surface

adherend, the materials that cannot be directly bonded or are difficult to bond can pass through this layer to make the bonding force. To improve, the composition of this interface layer is called a coupli

(6) Other additives

In order to meet some special requirements and improve a certain characteristic of the adhesive, sor specific additives are sometimes added. Add the anti-aging agent to improve atmospheric aging resis add an anti-mildew agent to prevent bacterial mildew; add tackifier to increase the adhesion and visc glue; add polymerization inhibitor to improve the storage of glue; add flame retardant In order to ma adhesive layer not easy to burn and improve the flame resistance of the bonded products. They have required components and depend on the properties of the main ingredient of the formulation and th requirements of the adhesive.

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