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Abstracts from the Journal, "Chemistry and Adhesion" (Published in the Peoples Republic of China) Issue No. 2, 1986.

Synthesis of triglycidyl isocyanurate

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Triglycidyl isocyanurate is a new type of epoxy resin. It has remarkable heat-resistance, weather-endurance, excellent adhesion and electric performance in comparison with general purpose epoxy resins. This compound was prepared by an improved two-step process. First, cyanuric acid reacted with epichlorohydrin in the presence of a catalyst, and an intermediate, tris-(3-chloro-2-hydroxypropyl) isocyanurate was obtained. Second, dehydrohalogenation of the intermediate was performed in the alkaline medium, yielding the crude product. After recrystallization from low-carbon alcohols, a white crystalline pure product appeared. The melting point of the product is from 90°C to 125°C, the equivalent weight of epoxy resin is lower than 110 and the viscosity is lower than 100cp, which are in agreement with the values from the references.

The interface energy of epoxy resin adhesives

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Based on the determination of the contact angles and the geometric-mean equation, the interface energy of epoxy adhesives (DGEBA E-53: EMI_{2,4}, 100:8, w/w) bonding Al, Cu, Hg and liquid paraffin have been measured. For the surfaces of bulk adhesive produced by grinding and polishing, its energies γ^d , γ^p are 34 and 7 dyn/cm. For the adhesive interfaces peeled from the metal joints, the surface energies have been determined, γ^d , γ^p are 32-35 and 10-12 dyn/cm. If the same adhesive is cured in liquid paraffin, they are 37 and 3 dyn/cm respectively. The explanation is proposed that the distribution and orientation of polar groups at the

interface of the epoxy adhesive system will vary with the polarity of the adherends, and cause these differences.

Adhesive filling material with PN type double paste agent for molars

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This dental adhesive filling material consists of two pastes. Each paste contains a polymerizable monomer which is made by pentaerythrite and acrylic acid and a silane-treated Si_3N_4 as the inorganic filler. One of the pastes contains benzoyl peroxide as curing agent, and the other contains *N,N*-Bis-(hydroxyethyl)-4-methylaniline as the activator. The two pastes are mixed in equal amount before the filling material is used and the curing time is about 3 mins., after mixing at room temperature. The cured composite resin has excellent mechanical properties such as good abrasion-resistance, high compressive strength (up to 3961 kg/cm^2), high hardness (BH. 79) and very low thermal expansion ratio. If the bonding agent containing an organic titanate is applied on the acid-etched tooth before filling, the bond strength of the composite to the bovine enamel is about 64 kg/cm^2 .

Mathematical model of tubular fixed-bed catalytic reactor

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In this paper, two methods for solving the quasi-homogen two-dimensional model for tubular fixed-bed catalytic reactors are discussed. One is Crank-Nicolson finite difference method, the other is an approximate analytical solution proposed by the present author. Digital computation programmes are presented. With the wall temperature as a parameter, the thermal stability of the reaction tube was investigated.

A numerical example of production of phthalic anhydride by catalytic oxidation of *o*-xylene shows that the calculated results obtained by both methods are in agreement closely.

Synthesis of 3-phenoxy-2-hydroxypropylmethacrylate

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The reaction of glycidyl methacrylate with phenol in the presence of basic catalyst has been studied to prepare 3-phenoxy-2-hydroxypropylmethacrylate. *N,N*-Dimethylbenzylamine has been found to be an excellent catalyst, and 3-phenoxy-2-

hydroxypropylmethacrylate was obtained in high yield when the reaction was performed at 90–100°C. 2-phenoxypropyl-1, 3-dimethacrylate was identified as by-product when the reaction was carried out in the presence of N,N-dimethyl benzylamine.

Preparation of phthalic anhydride from naphthalene and o-xylene by process of double connected reactor

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At present, there are two raw materials for the production of phthalic anhydride in Heilongjiang Province. They are naphthalene and o-xylene, and the quantity of them is not very much. In the meantime, a phthalic anhydride plant using o-xylene as the raw material has been set up and it has the capacity of 3000 tons per year.

Based on this reason, the problem of producing phthalic anhydride by using the two connected reactors has been proposed. It is necessary to transfer the present installation into the connected reactors using both of naphthalene and o-xylene as raw materials for the production of phthalic anhydride. In this way two times quantity of phthalic anhydride with good quality can be produced, a large quantity of investment can be saved and the energy consumption can be reduced. So it will be favourable for the development of the production of phthalic anhydride in Heilongjiang province.

J-41 structural adhesive for bonding of metal plate to plate and plate to honeycomb core

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Liu Ting-xiu, Qin Jia-ping
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J-41 Structural Adhesive is related in this paper. It consists of a film and a primer. The film was formed by the solvent-less calendering. An epoxy resin, DICY and an accelerator were contained in the film. The adhesive system should be cured at 120–130°C. Most kinds of material can be joined. It is especially suitable for the bonding of aluminium alloy plate to plate and plate to honeycomb core. The application method is also mentioned. Highest adhesion strength is achieved on the aluminium alloy surfaces. This epoxy adhesive system has excellent heat-moisture-resistance and oil-resistance. It can be in service from –60°C to 100°C for a long time.

Theory on interaction between acid and base in adhesion

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Peking University) Beijing, China

The Fowkes' adhesion theory of acid-base interactions is introduced and reviewed.

Foreign survey of development and application in techniques of curing with ultra-violet light and electron beam and in related resin

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The curing technology of ultra-violet light and electron beam has three advantages, energy saving, resource saving and no environmental pollution. This technology has great significance in replacing traditional heat curing method. The development of this technology is very quick and applications are spreading widely abroad. The research and production of the photocuring resins being correlated with this new technology also has been developed. This paper is mainly related to the ultra-violet light, electron beam curing application and survey of the resin development. We should pay much attention to this new technology and new materials. So far, there are a lot of domestic units going on researching in this field. We can say that this new technology will be developed rapidly in our country.

Development and deficiency of electrically conductive adhesives in China

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This paper summarizes the development in the study of electrically conductive adhesives in China in following four respects: a conductive adhesive with copper powder or silver-plating particle as its filler has been developed, the conductivity and bonding strength of silver-powder conductive adhesive were improved, a conductive adhesive withstanding high temperature of 1000°C was developed and a new test in conductivity mechanism was commenced. However, the variety and the property of conductive adhesives in China should be further increased and developed, particularly, in high conductivity, high bonding strength, room-temperature curing and high-speed curing, high heat-resistance and non-epoxy-resin varieties, etc., and there is deficiency in comparison with foreign similar adhesives. The study on fundamental property of conductive adhesives, for example temperature effect, electric current-resistance, voltage-resistance and durability, etc., was not paid special attention; therefore, its application range was limited. In the paper the table of new variety of conductive adhesives in China and the table of main variety of conductive adhesives in USSR were listed.