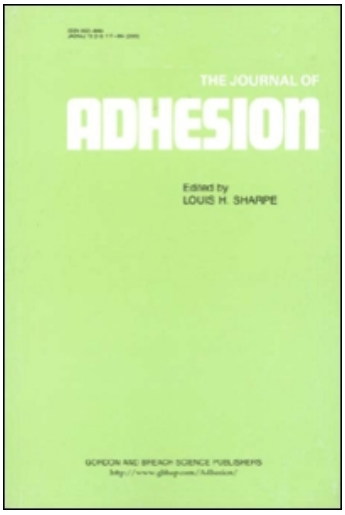

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Contents

Surface Treatment of Co-γ-Fe_2CO_3 with Water-Soluble Polymers

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Abstract

Adsorption behavior of water-soluble polymers, sodium polyacrylate and poly (styrene sodium sulfonate-sodium maeate), onto Co-γ-Fe_2O_3 particles (particle length; 0.25 μm) and the dispersibility of Co-γ-Fe_2O_3 treated with the water-soluble polymers were examined by means of surface chemical measurement and magnetic measurement (Rotating-Vibration method).

Langmuir isotherms were obtained for water-soluble polymers on the particles. No change was observed in zeta potential of the particles before and after the surface treatment.

The dispersibility of Co-γ-Fe_2O_3 particles in oil-soluble binder (vinyl chloride copolymer) solution was extremely improved by treating the particles with water-soluble polymers. This improvement in the dispersibility was explained by considering the steric effect due to the double adsorption layer which consisted of water-soluble polymer and oil-soluble binder.

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Liquid Rubber Modification of Room Temperature Cured Epoxy Adhesives 1. Compatibility and Bond Strength

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Abstract

The effect of phase structure on bond strength was studied using room temperature curable epoxy adhesives consisting of diglycidyl ether of bisphenol A, polyamide and various amounts of liquid butadiene-acylonitrile copolymer or liquid polybutadiene. The results show that the liquid copolymer was partly compatible with epoxy matrices and that peel strength of bonded steel increased by addition of 5–10 parts of the copolymer. However, both tensile shear and peel strength were decreased in the presence of larger amounts of the copolymer owing to plastization of the matrices.

On the other hand, liquid polybutadiene was found to be incompatible with epoxy matrices and dispersed as droplets in the adhesive layer. In this case, the peel

strength increased with the increase of liquid rubber contents in adhesives without significant decrease of tensile shear strength.

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Copolymerization of Cyanoacrylate with Vinyl Ketone

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Abstract

Copolymerization of ethyl cyanoacrylate (ECA, M_1) with methyl vinyl ketone (MVK, M_2) was studied. Monomer reactivity ratio of ECA was determined by Fineman-Ross method, and the result of it is as follows:

$$r_1 = 2.67 \qquad r_2 = 0.14$$

Q and e values of ECA were calculated for these results,

$$Q_1 = 9.68 \qquad e_1 = 1.67$$
$$Q_2 = 0.69 \qquad e_2 = 0.68$$

The copolymer of ECA with a small portion of MVK enhanced the heatresistance property.

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Contents

A Simple Numerical Method for Analyzing Elastic-plastic Stress Distribution and Progressive Failure in Adhesive Layer of Bonded Lap Joints

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Abstract

This paper describes a simple numerical method to analyze elastic-plastic stress distribution of adhesive layer and to simulate its progressive failure for bonded lap joints. Von Mises yield criterion is adopted for adhesive layer and both isotropic and kinetic hardening are considered. The former one dimensional numerical method based on the F.E.M. was developed to the present method. It was also extended in order to consider the failure of adhesive and calculate the crack growth by applying the Mohr-Coulomb failure criterion.

First, we showed a difference of progressive plastic zone in the adhesive layer between single and double lap joints subjected to tensile shear load. Second, crack growth of the single lap joint subjected to pure bending load was calculated. The calculated result was well correlated to the experimental result reported before. It was found from calculation that a catastrophic failure did not occur as soon as the crack initiated at the one lap end and it extended gradually with an increase of bending load.

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The Influence of Metal Complexes on Adhesion of Rubber and Brass

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Abstract

The relationship between the adhesive effect of brass and the additional amounts of $Fe(acac)_3$(1), $Mn(acac)_3$(2), and $Cu(acac)_3$(3) metal complexes to BR was examined by the direct adhesion method of the rubber and the brass.

Consequently, no effect was recognized in the case of (1) and (2).

On the other hand, the adhesive effect of brass by the addition of 0.25 (phr) and 0.5 (phr) of (3) to BR showed twice as strong adherence as BR.

The destruction by tension was seen in the rubber layer, which was cohesion failure.

Adding Cu-complex (4) of 1-(p-substituted phenyl)-1,3-butanedianes (HL, L = p-$XC_6H_4COCHCOCH_3$, X = COOH(a), Br(b), C_2H_5(c), CH_3(d), OH(e)) to BR, the influence of the kinds of Cu(II) complex (4) and the additional amounts on the adhesive strength was examined.

It was found that the addition of more than 0.25 (phr) caused the destruction by the tension in the rubber layer, and the strength of adherence increased in the order of non-addition < (4e) < (4a) < (4b) < (4d).

Comparing the nature of vulcanized rubber added 0.25 (phr) complex Cu(II) (4) with that of non-added complex, by the addition of complexes, the rubber became hard, and the initial strength of tension increased.

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