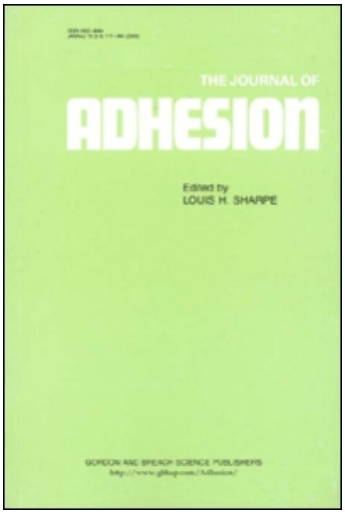

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Contents

Adhesive Strength of Epoxy Adhesive and Ceramic Adhesive at High Temperature

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Abstract

The adhesive strength at high temperature was experimentally investigated by subjecting butt joints of two cylinders to axial and torsional loads. The materials used for the joints were carbon steel for adherend, and epoxy and ceramic adhesives for adhesive resin. The effects of temperature on adhesive strength were examined at various temperatures. The adhesive strength decreased at high temperature compared with the strength at room temperature. The tendency was similar to the strength of adhesive resin at various temperatures. The thermal stress in the adhesive layer of the butt joint was analyzed by using finite element method. The effect of thermal stress on the adhesive strength was small in the temperature conditions used in the experiments.

(Received: July 4, 1987)

Water-Resist Property of Butt Joint using Film Adhesive

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Abstract

The purpose of this article is to investigate the water-resist property of a butt joint using film adhesive relating to silane coupling treatment and no treatment. Two kinds of adhesives, epoxy resin and nitrile-phenolic resin, and three kinds of a adherends, stainless steel, mild steel and aluminium alloy are used.

The results obtained are as follows:

(1) The water-resistance of epoxy resin and nitrile-phenolic resin adhesives of adhesive bonded part with silane coupling treatment (γ-glycidoxypropyltrimethoxysilane) became higher than that of no treatment, as shown in former papers.

(2) The half-life of water-resistance for adhesive strength of nitrile-phenolic resin adhesive showed Arrhenius type, and activation energies ranged from 27 to 28 kcal/mol.

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Contents

Thermo-Elastic Analysis of Adhesive Bonded Joints by Boundary Element Method

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Abstract

Two-dimensional thermo-elastic analysis program by Boundary Element Method has been prepared. This program is for the analysis of adhesive bonded joints and using a quadratic element.

First, the concrete expressions of thermo-elastic term which is added to the Boundary Integral Equation as for two-dimensional elastic problem are showed. And it is given that the linear equation about the stress–strain on the boundary, in case of initial-stress problem. And the concrete expressions of thermo-elastic term which is added to the expression about the stress of the inner points are showed.

Secondary, thermo-elastic problem about simple steel plate, compound plate of steel-plastics-steel and steel-copper-steel, and single lap adhesive bonded joint are analyzed. According to these results the validity and effectiveness of this program are proved.

Finally, the problem of the curing stress of adhesive is analyzed by this program.

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Molecular Weight Distribution and Adhesive Properties of Pressure Sensitive Adhesives Consisting of Acrylic Polymer

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Abstract

A series of poly (butyl acrylate) with a variety of molecular weights were synthesized and effects of molecular weight and molecular weight distribution of polymer mixtures on adhesive properties of polymer mixtures prepared with these PBA were investigated.

In the case of mixing high molecular weight polymer with low molecular weight polymer, 180° peel strength and cohesion decreased, but on the other hand, J. Dow ball tack increased with increasing of fraction of low molecular weight polymer, 180° peel strength, of a lavel to produce failure, and cohesion were controlled by limiting viscosity number $[\eta]$, rather than molecular weight distribution. However 180° peel strength, that produced interfacial failure, was under the influence of molecular weight distribution. On the other hand, ball tack was influenced by molecular weight distribution and increased by mixing polymer of low molecular weight. The reason for increasing ball tack seemed that mobility of polymer at the surface of pressure sensitive adhesives increased by mixing of low molecular weight polymer.

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