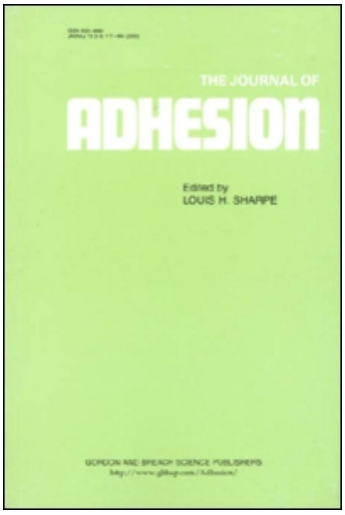


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# Contents List and Abstracts from the Journal of the Adhesion Society of Japan

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# Contents List and Abstracts from the Journal of the Adhesion Society of Japan

## Journal of The Adhesion Society of Japan
## Vol. 26 No. 10 1990
## Contents





### Effect of Critical Interfacial Stress on Adhesive Strength

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## Abstract

This paper deals with an effect of a critical interfacial stress ($\sigma_C$) under a constant rate adhesive test with common materials, although it has been generally recognized that a peel rate does not depend upon magnitude of a critical interfacial stress under the conditions of the constant rate adhesive test.

This paper also shows theoretically that the adhesive strength is represented by the relationship as to the product of $\sigma_C$ or interfacial separation work ($\Gamma_\infty$) and magnification factor ($F$) which reflects on viscoelasticity in the system.

On the other hand, the author standardized the concept of the adhesive failure energy which had been expressed by Gent, defined the generalized adhesive failure energy ($\Lambda$) and clarified the physical meanings.

Then, the author shows that $\Lambda$ is expressed by the relationship of the product of $\Gamma_\infty$ and the coefficient $\Phi$ which reflects on the magnitude of energy required to form the process region at the tip of the separation and finally pointed out that the intrinsic adhesive failure energy ($\Theta_0$) which was defined by Andrews does not mean the reversible work, but $\Gamma_\infty$.

(Received: May 7, 1990)

### Surface Segregation of Acrylate Copolymer/Fluoro-copolymer Blends

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## Abstract

The compatibility expected by Flory–Huggins–Scott theory, the density and the critical surface tension $\gamma_C$ obtained by the contact angle method of an acrylate copolymer/a fluoro-copolymer blends were investigated. Following results were obtained.

1) The acrylate copolymer/the fluoro-copolymer blends were expected the phase separation system by Flory–Huggins–Scott theory.

2) The density of the acrylate copolymer/the fluoro-copolymer blends increased with increasing of the fluoro-copolymer content.

3) It was predicted that the critical surface tension $\gamma_C$ of the fluoro-copolymer was much smaller than that of the acrylate copolymer.

Consequently, it was suggested that the surface segregation of the low surface energy component (the fluoro-copolymer) occurred on the surface of the blend contacted with air.

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# Durability of Single Lap Joints using Galvanized Steels and the Effect of Surface Pretreatments

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## Abstract

The adhesive joints of galvanized steels tend to fail at the plating-steel interface, and this fracture mode is regarded as unfavorable for corrosion protection.

In this work, the durability of single lap joints of galvanized steels and the effect of surface pretreatments were intensively studied.

The residual strengths of these joints were found to be much higher than those of the joints using cold-rolled steel when tested after exposure to accelerated corrosive environment, and to be comparable to those of cold-rolled joints exposed to humid conditions, regardless of plating fracture.

The primary cause of joint strength deterioration under corrosive conditions was corrosion of adherend which started from the edges of the lapped portion and, therefore, the galvanized joints exhibited superior durability. While there were two factors which affect the joint strength degradation under humid environment: plasticization of adhesive and loss of adhesion. To enhance the adhesion, three different surface pretreatments of adherend were tested, and the electro chromated joints were found to show best durability under humid environment.

(Received: July 21, 1990)



# Adsorption Behaviour of Polyurethane at the Water–oil Interface from Benzene Phase

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## Abstract

The solubility of Polyurethane (EO-PU) that was polymerized from various types of molecular weight ($\bar{M}$) of polyethylene glycol (PEG) and hexamethylene diisocyanate, in various solvents, was investigated. The adsorption behavior of EO-PU at water–benzene interface from benzene phase was investigated by the interfacial tension.

The following results were obtained:

1) EO-PU was dissolved in dimethyl sulfoxide (DMSO), *N,N*-dimethyformamide (DMF) and tetrahydrofuran (THF) at room temperature. The solubility of EO-PU in non-polar solvents such as benzene and toluene depended on the urethane group density in EO-PU molecule and solubility (SP) of the solvents.

2) EO-PU which was polymerized from PEG ($\bar{M} = 1000$ and 4000), decreased the interfacial tension more than that of the original PEG.

(Received: March 6, 1990)