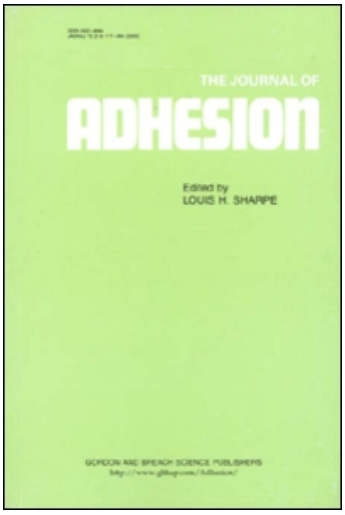

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Contents

Application of Macromonomer for the Pressure Sensitive Adhesives II. Phase Separation and Adhesive Properties

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Abstract

Pressure sensitive adhesives (PSA) were prepared by copolymerization of butyl acrylate, methyl methacrylate and polystyrene macromer and the effects of macromer on the adhesive properties and phase-separated structures were investigated. The results are as follows;

(1) The cohesion of the PSA increased as the quantity of the polystyrene macromer increased.

(2) The reason why the cohesion of the PSA increased seemed that polystyrene phase as the graft chain were separated from polybutyl acrylate phase as matrix.

(3) When styrene was used instead of polystyrene macromer, there were not these effects on the adhesive properties.

(Received: June 24, 1989)

Surface Improvement of PET film by MW Low-Temperature Plasma Treatment

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Abstract

For low-temperature plasma treatment, direct-current glow discharge, microwave discharge (MW: 2.45 GHz), and radio-frequency discharge (RF: 13.56 MHz) are used. To improve the high-polymer surface, the RF low-temperature plasma technique is extensively used. In this research, polyethylene terephthalate (PET) was selected and behaviors of surface activation by microwave discharge low-temperature plasma treatment were investigated through surface profile observation and chemical analysis, and from the viewpoint of wettability and adherence of matrix such as rubber or resin, comparing to RF low-temperature plasma treatment. It has been proved that compared to the RF low-temperature plasma treatment, MW low-temperature plasma, in which only excited species exist in order to transfer plasma to reaction chamber from active furnace, does not produce etching profiles on the PET film surface but polar groups are introduced in a large quantity, resulting in high adherence of rubber or resin with comparatively short treatment time.

(Received: August 17, 1989)

Adhesive Properties and Mechanism of Phase Separation for Mixtures of Vinyl Rich Polybutadiene/Rosin Tackifier Resins

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Abstract

The pressure sensitive adhesive properities of mixtures of vinyl rich polybutadiene (V-BR (70.4)) with some tackifier resins were investigated both by a ball tack measurement, based on J. Dow method, and by a peel strength in 180°. We could find that the mixtures with Rosin resins were excellent agents. Among the mixtures, the V-BR (70.4)/Gumrosin X exhibited a lower critical solution temperature (LCST) phase behavior, in which there was a critical temperature at around 80°C. Annealing it at the temperature above LCST, we could confirm a modulated structure, which was related to the spinodal decomposition.

The behavior of phase separation was investigated by light scattering technique. It was found that the phase separation could not obey Cahn linearized expression because of vaporizing Gumrosin X. From the results of linear relationship on $\ln I \sim t$ plot, apparent-activation energies of phase separations were estimated to be about 20 kcal/mol.

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Contents

Studies on The Modification of Epoxy Resin with Silicone Rubber. Part II Interfacial Tension of Telechelic Silicones in Contact with Epoxy Resin

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Abstract

In order to find the compatibilizer for epoxy resin/silicone rubber systems, interfacial tensions (γ_{12}) for five kinds of telechelic silicone (TCPS) were measured in contact with epoxy resin with sessile drop method. γ_{12} increased with the increasing of molecular weight (M) of TCPS. The linear relationship of γ_{12} and 1/M was also verified. From this relationship, it was possible to estimate a critical molecular weight at which γ_{12} reached to zero. It was found that the compatibility of functional end groups of TCPS to epoxy resin was in the following order: amino = glycidyl > carboxyl > hydroxyl > silanol.

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Tackiness of Acrylate Copolymer/Fluoride Copolymer Blends

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Abstract

The adhesives performance (adhesion, tack), the storage modulus G' and the surface structure observed by means of scanning electron microscopy SEM were investigated for blends having composition of acrylate copolymer (main monomer: 2-ethylhexylacrylate) and fluoride copolymer [poly (vinylidene fluoride-co-hexafluoroacetone)]. Following results were obtained.

(1) The adhesion for the stainless steel of all blends exhibited the cohesive failure in blend layer. When blends were composed with 40 and 50 wt% of fluoride copolymer component, the adhesion decreased rapidly with increasing of G'

(2) In the range of 0 to 40 wt% of fluoride copolymer component, the J. Dow ball tack decreased with increasing of G', while the J. Dow ball tack at 50 wt% blend of fluoride copolymer increased with increasing G'.

(3) It was suggested that the acrylate copolymer layer and the fluoride copolymer layer existed at 50 wt% blend of fluoride copolymer by means of SEM.

(Received: November 11, 1989)

UV-curable adhesives for optical communications

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Abstract

UV-curable optical adhesive systems featuring refractive indices in the 1.45 to 1.59 region controllable to within 0.005 are developed using new fluoro-epoxies and fluoroepoxy (meth) acrylates. These adhesives posess excellent refractive index matching with optical glass and optical fibers, and the joints exhibit high bonding strength and good durability. These high performance adhesives are readily applicable as optical adhesives in fabricating of optical components, attaching of fibers to optical waveguides, and splicing optical fibers for optical communications.

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