

Studies on water-resistance improvement of water-soluble adhesive used for duplex-wallpaper

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1. Introduction

Recently adhesives market, the water soluble adhesives most plentifully is used with 34.5% of the whole except formaldehyde, A is caused by specially with environmental regulation and is a tendency where the water soluble adhesives use extends on a large scale. The water- soluble adhesive is used in the duplex-wallpaper production process

EVA adhesive is an effectiveness but expensive, PVAc is a cheapness but low water-proofing. Acrylic adhesive is a difficult in control of production. Reason of improving Water proofing is Productivity decrease from the total wallpaper manufacturing process and Fraction defective increase and work characteristic decrease at the Construction spatial-temporal site. In this work, we synthesized Poly-vinyl acetate/acrylic monomer copolymer binder it will be compared water proofing

2. Experimental

2.1 Materials

vinyl acetate, 2-ethylhexyl acrylate, n-butyl acrylate, methacrylic acid, acrylic acid, acryl amide, methyl methacrylate, N-methylol acrylamide(monomer), ammonium per-sulfate, potassium per-sulfate (initiator), poly vinyl alcohol(protecting colloid), nonion, anion surfactants, co-polymerization surface tants(emulsifier)

2.2 Polymerization

PVA puts in the Maine tank(rising temperature) and vinyl acetate, emulsify put in the semi tank to be a pre-emulsion, initiation reaction is dropping 6% pre-emulsion during 30 minutes at 78°C, propagation reaction is dropping emulsion during 3 hours at 80°C

Acrylate copolymer, emulsion resin puts in the tank.

The Binder was made from Vinyl acetate mixed with Acrylate copolymer. Hard type binder has higher Tg better then Soft type binder.

2.3 Peel Test, Water Proofing Test

The sample prepared Soft, Hard type binder treated Cotton fabric and dried on 1day at standard condition It was measured Test method for adhesion of bonded fabric by KS K 0533 and Resistance of adhesive bonds to water was tested by KS M 3730. It was immersed in the water for 10min. that water proofing test sample.

3. Result and Discussion

3.1 Polymerization

PVAc polymer is measured water tolerance and liquidity to degree of polymerization, PVA's saponification number The higher saponification number was to be improvement in water tolerance but liquidity has taken a turn for the worse. PVA have an effect on water tolerance, liquidity and storage stability.

Acrylate copolymer Tg was controlled by monomer composition. The higher Tg(at 10°C) was to be improvement in water tolerance and liquidity but when mixing the PVAc, storage stability has taken a turn for the worse.

3.2 Resistance of Water tolerance

Peel Test and Water Proofing Test the result of test with after words is same.

Table 1. Result of Soft type binder's Peel Test

Soft type	Max Force (N)	Average (N)
Sample1	9.91	8.27
Sample2	9.54	7.91
Sample3	7.90	6.09
Average	9.12	7.42

Table 2. Result of Hard type binder's Peel Test

Hard type	Max Force (N)	Average (N)
Sample1	9.21	7.05
Sample2	7.42	6.34
Sample3	9.67	7.37
Average	8.77	6.92

Table3. Result of Soft type binder's
Water proofing Test

Soft type	Max Force (N)	Average (N)
Sample1	1.80	1.12
Sample2	2.15	1.25
Sample3	1.95	1.14
Average	1.97	1.17

Table 4. Result of Hard type binder's
Water proofing Test

Hard type	Max Force (N)	Average (N)
Sample1	2.33	1.88
Sample2	3.15	2.32
Sample3	2.83	1.77
Average	2.77	1.99

Resistance of Water tolerance(R) was evaluation this

$$R = Y/X \times 100$$

X= value of Peel Test

Y= value of Water proofing Test

Table 5. Resistance of Water tolerance(R)

	Soft type	Hard type
Max R	21.6	31.6
Average R	15.8	28.8

4. Reference

[1] Chavez-Valencia, L.E. ; Alonso, E. ; Manzano, A. *Construction & building materials* ,.21. 3 , 583(2001)

[2] S, Atsushi ; O, Takuji *Journal of the Society of Rubber Industry of Japan* , 79. 2 , 67(2006)

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